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Table of Contents

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ORIGINAL ARTICLES— PAGE.

The Halford Oration, by SIR JAMES BARRETT, K.B.E., M.D., F.R.C.S. .. 707
"Observations on the Movement of Cells in Vitro with Reference to Tumour Immunity", by WARNFORD MOPPETT, M.D. .. 718
"The Effect of X Rays on the Blood and Spleen of White Mice: A Preliminary Investigation", by G. BOURNE .. 722

REPORTS OF CASES—

"Faucial Diphtheria Associated with Purpura Hæmorrhagica", by RUSSELL N. HOWARD, M.D. 723

REVIEWS—

The Coronary Arteries and Their Diseases .. 724
Hygiene .. 724

LEADING ARTICLES—

Modern Optometry .. 725

CURRENT COMMENT—

Peptic Ulcer .. 726

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—

Pædiatrics .. 728
Orthopædic Surgery .. 729

BRITISH MEDICAL ASSOCIATION NEWS— PAGE.

Scientific .. 730

MEDICAL SOCIETIES—

Ballarat Clinical Society .. 731

OBITUARY—

George Redfearn Hamilton .. 731

CORRESPONDENCE—

The Price of Ether .. 733
Post-Graduate Study in Europe .. 733
Prostatectomy .. 733

NOTICE .. 734

BOOKS RECEIVED .. 734

MEDICAL APPOINTMENTS VACANT, ETC. .. 734

MEDICAL APPOINTMENTS: IMPORTANT NOTICE 734

EDITORIAL NOTICES .. 734

The Halford Oration.[1]

By SIR JAMES BARRETT, K.B.E., M.D. (Melbourne), F.R.C.S. (England),
Melbourne.

IN delivering an oration in memory of a most distinguished man, who was to me not only a generous-minded teacher, but also a kind friend, and under whom I served for several years, it is fitting that in the first place reference should be made to the personal side of the subject. Professor Osborne, in his oration of 1929, dealt so fully with Professor Halford's career that there is little left for me to add.

I entered the Medical School as a first year student in 1877, that is, fourteen years after its establishment, and graduated in 1881; and consequently was a student under Professor Halford in the subjects of anatomy, physiology and histology, and pathology for three years. After more than two years spent as resident medical officer at the Melbourne Hospital, I left for London and became a demonstrator and lecturer in physiology at King's College, London. On return to Australia toward the end of 1888 I became Demonstrator of Physiology in the University of Melbourne, on the recommendation of Professor Halford, and occupied that position until his retirement from office in 1896, at the age of seventy-two years. I remained on as demonstrator for one year longer, at the request of Acting Professor (now Sir Charles) Martin, to give him time to effect his own organization.

Thus it happens that I saw much of Professor Halford's work and character. As Professor Osborne has pointed out, he was appointed on the recommendation of Professor Owen and Sir James Paget as "one of the most distinguished experi-

[1] Delivered at the Institute of Anatomy, Canberra, November 23, 1932.

mental physiologists of the day. His name would give distinction to any university".

As in the case of nearly all great medical men, his early training had been from the outset thoroughly practical. Such training is essential to a sound knowledge of medicine and to the larger viewpoint which comes with maturity. It is strange that it should be so, but it is a fact that efficient practitioners do not begin the study of practical medicine late.

He had been House Surgeon to the Westminster Hospital, Senior House Surgeon to the Liverpool Royal Infirmary and Lunatic Asylum, and Honorary Surgeon to the Bridgworth Infirmary. He was a Member (and later Fellow) of the Royal College of Physicians (M. & F.R.C.P.), a Member of the Royal College of Surgeons (M.R.C.S.), Licentiate of the Society of Apothecaries (L.S.A.), and Doctor of Medicine of Saint Andrews. At the time of his appointment he was in practice in London and also a lecturer on anatomy at the Grosvenor Place School of Medicine. There were, however, two features about him which attracted much attention. He possessed a knowledge of comparative anatomy of unusual scope and solidity at that time, and, with this powerful background of knowledge, was one of the pioneers who introduced the system of experimental physiology into medical study. When anyone with real ability starts from such a basis, remarkable results may follow and in his case did so.

Had he remained in London, he would have become a great physiologist until his reputation caused him to be overwhelmed by practice. When, however, he decided to make Australia his home, he had the responsibility of making and administering a medical school and teaching three subjects, not one of which nowadays is completely covered or really attempted to be covered by any one man. A specialist in these subjects today endeavours by incessant work to obtain a thorough working knowledge of the subject and devotes his research ability to some portion of it. These subjects have become so vast that no man can explore the whole of the field.

What lives in my memory most clearly is the soundness of his educational method. Students who meant business were encouraged and helped with many evidences of good-natured humour, but they were definitely made to understand that their success must depend on the painful and laborious ascertainment at first hand of the fundamental facts on which principles were based, and not, as he tersely put it, on "windy nonsense". Sound education implies sustained effort on the part of the student, a principle which Professor Halford insisted upon.

Furthermore, his solid English character led him to pick out capable and reliable young men and to give them opportunities. So we find him pushing Harry Brookes Allen promptly into the position of Demonstrator of Anatomy in the University and Pathologist to the Melbourne Hospital almost as soon as he graduated in 1876-1877.

His controversial methods were direct and to the point, and, if severe, were punctuated with flashes of humour. One visiting lecturer who spoke at large on evolution, drew a rejoinder in which the following passage occurred, I think in defence of Professor Owen: "Hyperion to a satyr. Solid science to windy nonsense."

In concluding the references to the personality of a man to whom, in common with many others, I owe so much, may I say that, could he revisit the school, he would be delighted to find that the application of comparative anatomy and physiology to human anatomy has assumed a remarkable development in the hands of his successor in the chair of anatomy, Professor Wood Jones, and that the experimental method, novel in his time, has now assumed proportions and characters that no one could have foreseen. The data of subjects have increased to an extraordinary degree and no mortal man can do more than keep them in outline survey.

The sound fundamental method adopted by Professor Halford, of making sure that the foothold on one crossing stone is secure before you move the other foot, remains, as it always was, the sheet anchor of all advance in knowledge.

Believe me, it is no mere accident that such men as Sir Harry Allen, Sir George Syme and Sir Richard Stawell and many other eminent men were produced from a young, obscure, very small and ill-equipped medical school in the South Pacific. Their success was due to his methods and personality.

It is necessary to refer to a most important project which Professor Halford apparently supported, but was unable to bring to fruition. It was proposed, about 1865, to place the Melbourne Hospital alongside the Medical School, an arrangement which would have been a source of incalculable advantage to both the hospital, the school and the public. It is now, nearly seventy years later, regarded universally as the ideal and necessary arrangement throughout the civilized world. The proposal failed for various reasons.

Under urgent representations from the medical profession, the government of Mr. Hogan in 1928 revived the project and offered six acres of land adjoining the Medical School for a university hospital, but before the transaction could be completed his government went out of office. The incoming government cancelled the arrangement and favoured the sale of the Melbourne Hospital and its removal to the Pig Market site, which would have involved the rebuilding of the Medical School ultimately on that site at enormous cost. The State has suffered severely from these incessant oscillations.

The principle implied is that the practising surgeons and physicians shall have easy access to the departments of anatomy, physiology, biochemistry and pathology. Conversely, the officers of these departments should be brought into daily contact with the difficult and intricate practical problems which face clinicians. It is a system

which benefits the patient, the practitioner and the academic officer alike.

It is noteworthy that with the aid of the Rockefeller Foundation the University of Sydney is rebuilding the greater part of the Medical School actually in the grounds of the Royal Prince Alfred Hospital. It is so arranged that patients can be wheeled through a short covered way into the Medical School, where all facilities will exist for the investigation of difficult cases. The cost of rebuilding the Melbourne Medical School would be at least £200,000.

The size of the school up to 1877 is indicated in the following table. Yet during this period it had produced several distinguished graduates, including Sir Harry Allen.

TABLE I.

Number of Medical Students entering the Medical School of the University of Melbourne.

Year.	Number of Students.
1862	3
1863	0
1864	1
1865	4
1866	1
1867	3
1868	5
1869	4
1870	7
1871	5
1872	10
1873	9
1874	7
1875	12
1876	13
Total entries	84

In 1867 the first two students graduated as bachelors of medicine, namely, William Carey Rees and Patrick Maloney. The number of students in the Medical School in 1932 is 122 in the first year, and the total number is 445.

With this brief but, I hope, just and sympathetic reference to a distinguished figure, I propose now to deal with three great subjects in historical sequence, namely, medical education as it was organized by Professor Halford, medical education as it is today, and medical education as I think it will be arranged in an enlightened future.

Change and expansion have been, and are, inevitable. The mass of material has become enormous and will become still greater. But sound methods remain as before, though wider and wider vision becomes essential to real progress.

Professor Halford reached Melbourne in December, 1862. The new Medical School building was ready for use in May, 1865. It now forms part of the Department of Chemistry and Physiology. He taught at first in a hired shed in Madeline Street, Carlton.

The Council of the University, with remarkable insight, rejected Sir James Paget's advice to establish a three or four years' course and adopted a five-year curriculum with five annual examinations. It was a more lengthy curriculum than that which existed in England until about 1892.

The problem at that time was whether a medical school should be an isolated institution or part of a university. Professor Halford chose the latter course, now universal wherever practicable.

He accepted this curriculum, in spite of its unusual length at that time, but insisted on the inclusion of physics, or as it was then called "natural philosophy", in the first year, for, as he rightly saw, physics is a fundamental subject of medicine, a remarkable evidence of the fact that he was much in advance of his time.

A compromise was effected by which either physics or classics could be taken in the first year and this was the position when I entered the school in 1877. However, classics were gradually dropped and physics was ultimately made compulsory. The curriculum was a remarkable one for the period on which it was organized and was as follows:

First Year:
Physics or classics.
Chemistry, including practical chemistry.

Second Year:
Botany.
Medical botany and therapeutics.
Comparative anatomy and zoology.
Human anatomy.

Third Year:
General anatomy, physiology and pathology.
Surgery and hospital practice.

Fourth Year:
General anatomy, physiology and pathology.
Medicine.
Obstetrics and gynæcology.
General and women's hospital practice.

Fifth Year:
Medicine and surgery.
Forensic medicine and hospital practice.

The profound interest in this curriculum is the insistence on education in the basic sciences for practically two and a half years, since in the third year the day was spent in the Medical School after noontime. In my judgement this step, so unusual at the time, has had much to do with the success of the school. Those concerned had the option of training medical technologists or of training men of science who would apply themselves to the practical problems of medicine, and it says much for Professor Halford's foresight that he unhesitatingly chose the latter course.

So the school developed, students gradually increased in numbers, and in due course supplied all the requirements of Victoria and some other States, and by their solid foundation of knowledge established an excellent reputation for the school both in Australia and elsewhere.

But great changes were occurring. Professor Halford knew little or nothing of the germ theory of disease or of biochemistry or of the special subjects whose practice was first appearing on a large and expert scale, such as ophthalmology, dentistry *et cetera*. But practically no one else was so informed at that period, and I venture to set out some milestones to fix in mind the path of progress.

Lister, following the investigations of Pasteur, began to develop the germ theory of septic infection in 1867 and had made some progress by 1873. In 1877 Pasteur and Koch proved that anthrax was caused by a germ, and in 1882, for the first time, Pasteur produced artificial immunity to disease, namely, anthrax. The tubercle bacillus was also discovered in 1882. The cholera vibrio was identified in 1883. Pasteur's demonstration of artificial immunity in 1882 is the greatest milestone in medical progress. Yet it is only fifty years since this memorable event took place.

Naturally, knowledge of the changes reached Australia slowly and practical action lingered, but in 1882, whilst Sir George Syme and I were house surgeons at the Melbourne Hospital, a dramatic event took place. The hospital was supposed to be a plague house, because so many injured patients became infected with sepsis, often fatally. Injured people objected to being taken there for fear of death. Whilst we were in residence no patient whose abdomen was opened recovered. The most elaborate precautions were taken in the way of clean rooms, fresh paint *et cetera*, but the things that really mattered escaped notice, namely, the hands, clothing and instruments of the operator, because no one at that time knew what surgical sepsis was, and no one guessed that infection was caused by these agencies.

At this juncture a young surgeon, the late Bernard Newmarch, who had been a house surgeon to Lister, passed through Melbourne and showed us how to disinfect wounds. The methods were, from the modern standpoints, crude, but the results were magical, and antisepsis became the order of the day. The older practitioners on the whole adapted themselves to the changed methods fairly well, though they did not like a hospital that reeked of carbolic acid. It was a most noteworthy instance of a simple principle, once understood, at once producing profound practical changes. It indicates, as has so often happened, that thinkers really rule the world, though it is also true, as Kuhnt has put it, that comparatively few people really shake themselves clear of prepossessions and think out problems anew.

Since that period the following diseases have been found to be associated with germs, and everyone thought till recently that the problem of these diseases was solved.

The Result of Scientific Demonstration.

Once one disease was definitely proved to be caused in this manner, and it was demonstrated that immunity of the healthy could be produced, the work was done. Other men devoted their lives to the investigation of all diseases with a view to ascertaining whether they were produced by germs or not. What has been the result? The following list gives the names of most of the diseases so traced, that is, germs are definitely associated with the disease: acne, African tick fever, amœbic dysentery, anthrax, actinomycosis, bacillary dysentery, bilharziasis, boils, botulism, bubonic plague, carbuncle, cerebro-spinal fever, cholera, dengue fever, dental caries, diphtheria, filaria, foot and mouth disease, fungus skin diseases (ringworm *et cetera*), *encephalitis lethargica*, glanders, hookworm, hydatid, influenza, infantile diarrhœa, infective jaundice, leprosy, malaria, malignant œdema, Malta fever, paratyphoid fever, phlebotomous fever, pneumonia, pneumonic plague, puerperal fever, relapsing fever, Rocky Mountain fever, sleeping sickness, surra, Texas fever, tetanus, trench fever, tuberculosis, typhoid fever, typhus fever, venereal diseases, Vincent's angina, whooping cough, yaws, worms (intestinal).

But in many cases we are not certain now that the germ is the sole cause of disease. The following diseases are contagious, and are probably caused by organisms: hydrophobia, measles, rinderpest, scarlet fever, smallpox.

It is obvious that once the nature of disease was understood, the conception of prevention immediately arose in men's minds and has gained in strength ever since.

But as investigation proceeded, certain diseases were shown to be produced by dietary deficiencies and not by organisms, for instance: beri beri, pellagra, rickets, scurvy.

Please remember that this knowledge of germ causation is only about fifty years old, and in most instances much more recent. It was found that there are two methods by which diseases are conveyed by living organisms from man to man: (i) As in typhoid fever, by an insect which simply acts as a porter, carrying the germ incidentally from place to place. (ii) As in malaria, by an insect or other living thing, in which the parasite undergoes developmental changes.

The following lists give the names of some of the diseases carried by these two methods.

Diseases often carried by insects, the insect, mostly the house fly, simply acting as a porter for the organisms: amœbic dysentery, anthrax, bacillary dysentery, cholera, diphtheria, influenza, Malta fever, measles, paratyphoid fever, scarlet fever, smallpox, tuberculosis, typhoid fever.

Diseases carried to other persons only by insects or other living creatures: African tick fever, bubonic plague, bilharziasis, dengue, filaria, kala azar, malaria, phlebotomous fever, relapsing fever, sleeping sickness, trench fever, typhus fever.

So late as 1885, forty-seven years ago, there was no means of receiving instruction in bacteriology, that is, germ diseases, in the British Empire, though individuals, notably Sir Watson Cheyne and Professor Klein, were at work. I consequently attended the only available place at which instruction was given, namely, the Second International Course organized by the German Government, under Professor Koch, in 1885 in Berlin. The German Government acted with the promptitude which has always characterized Germany in making immediate use of any new discovery.

It is known now, however, that whilst the special germs are always found in the subjects of those diseases, yet in many cases inoculation with the germs fails to cause infection. This is particularly true of leprosy. In a few cases live germs have been inoculated into human beings without any result. In other words, there is a missing factor, and we are still unaware in many cases why some people are immune to these and other germs. We do know, however, that if we could exterminate these germs, the corresponding diseases would disappear, and this result is within the bounds of possibility, notably in the case of yellow fever.

These tremendous changes necessarily influenced medical education, but something else was happening. Owing to the extension of knowledge it was found that a well trained medical man, devoting himself to one phase of medicine, became more efficient in the practice of that special department than one who covered a larger field, and so specialists made their appearance in increasing numbers and variety. But it was also soon discovered that unless the fundamental training was sound, specialists were apt to become narrow in their outlook and apt to forget that they were not dealing with a machine, but with a complicated human being possessed of emotions and temperament. And so again we get back to the need for a sound fundamental education. To modify the words of Professor Huxley:

> We want men who in one department of knowledge are masters in thought and action, but who are interested in everything else on an interesting earth and consequently possess wisdom and understanding.

These great changes were soon reflected in medical education.

The Appearance of the Specialist.

So we find that in the University of Melbourne in 1887 vaccination appears as a special subject of study, that in 1900 children's diseases, ophthalmology, skin diseases, and mental diseases make their appearance in a curriculum which is constantly altering. The special subjects now set out in the curriculum are fourteen in number, and at least another half dozen are well above the horizon. They are the nightmare of those responsible for medical education, as their study leads to side tracks and occupies much time.

The fourteen subjects are: diseases of children, vaccination, anæsthetics, ophthalmology, otology, skin diseases, mental diseases, fevers and infectious diseases, venereal diseases, radiology, medical ethics, public health, forensic medicine, psychiatry.

To these we shall probably be asked to add: preventive medicine, and biochemistry (diabetes), climatology, hydrology *et cetera*.

Preventive medicine is in my opinion not a subject at all, but an attitude of mind which should dominate all medical teachers.

The curriculum at the University of Melbourne has just been revised, for, I think, the sixth time in my experience, but this time much more thoroughly than ever before. It now comprises three unbroken years of study in the basic scientific work, then more than two years' uninterrupted study in general medicine, surgery, obstetrics and gynæcology, and, finally, the fourteen specialties are studied during the sixth year, but without special examinations, that is, they are to be regarded as post-graduate studies.

What is to be done with the advancing army of new specialties?

Given a six-year course as at present, and one or two years in a hospital as resident medical officer, a practice essential to efficiency of the first order, and the graduate will be twenty-six or twenty-seven years old before he commences to earn a living. In the case of a specialist the period may extend over another two or three years. In my own case the total period was nine years.

You cannot take more of his life for general medical training, as the period must bear some sensible relationship to the normal length of life. Those who wish to become specialists are provided for by special post-graduate studies and diplomas, the study for which cannot be commenced until two years after graduation. The probable solution appears to be the incorporation of a sufficient knowledge of the new specialties in general medicine and surgery, the knowledge given being sufficient to enable the student to appreciate the value of the evidence given by a specialist and its relation to general medicine. For it should never be forgotten that the primary business of a medical school is to turn out the man who is the backbone of the profession, a general practitioner and a gentleman, thoroughly trained in general medicine, and with sufficient special knowledge to know when advice is requisite or to give aid in an emergency, if remote from special facilities, as so often happens. The instruction given in special work should be chiefly the teaching of method which can be applied if necessary.

The Public Health Movement.

But whilst these changes in knowledge had been taking place, something else had developed. There had gradually arisen in the minds of men two conceptions of public health, that is, the preservation of health and the extirpation of disease, and the gradual realization that man is forever fighting by bodily processes—though often without any effort on his part to aid them, in consequence of ignorance—against the onslaught of disease. In 1871 a British Royal Commission advised that the following measures be taken in the interest of health.

1. The supply of wholesome and sufficient water for drinking and washing.
2. The prevention of the pollution of water.
3. The provision of sewerage and utilization of sewerage.
4. The regulation of streets, highways, and new buildings.
5. The healthiness of dwellings.
6. The removal of nuisances and refuse, and consumption of smoke.
7. The inspection of food.
8. The suppression of causes of disease and regulations in case of epidemics.

9. The provision for the burial of the dead without injury to the living.
10. The regulation of markets *et cetera*, public lighting of towns.
11. The registration of death and sickness.

A sound but limited programme.

But when Pasteur and Koch placed the germ theory of many diseases on a stable foundation, though not as stable as they thought, more active and direct measures were taken. Furthermore, with the discovery that the mortality from diphtheria could be immensely reduced by the use of serum obtained from animals rendered artificially immune, somewhere about 1894, a new field was made visible and has been explored since with great energy and with varying success. In 1897, when Ross discovered that malaria was caused by the bite of an infected malarial mosquito, another enormous field was opened up, perhaps the most important ever rendered visible. The result was of unparalleled importance, and yet this tremendous discovery was made only thirty-five years ago.

But a still greater conception was rising in mind, namely, that the preservation of health and the prevention of disease were two separate, though allied, problems. We have seen the extraordinary development of medical education and have instanced some of the triumphs of medicine and surgery. A well trained nurse is now far more efficient than the average medical practitioner of one or two centuries ago.

The Disaster of Malaria.

An example of the devastation which malaria can cause has been furnished to me in detail by reason of the courtesy of General Sir Harry Chauvel and Colonel Downes.

The military operations which commenced at the Battle of Megiddo in Palestine in 1918, and which terminated nine weeks later with the occupation of Aleppo, furnish a classic example. The Desert Mounted Corps rode through the Turkish line near Jaffa with a strength of 27,500 men. At the end of the campaign they had lost 633 killed and wounded and 11,300 men from malaria and some influenza. General Chaytor's force in the Jordan Valley commenced with 13,000 men. They lost 139 killed and wounded and 8,352 from malaria and perhaps some influenza. One battalion lost 776 men in one week from malaria and were virtually annihilated. In both cases there were many deaths. Thus a force of 40,500 men in nine weeks lost 20,427 men almost entirely from malaria.

After men are bitten by an infected mosquito they have roughly seven to ten days before they are incapacitated. Field Marshal Lord Allenby informed me that he was aware of the danger and made his plans accordingly. He is, I think, the only commander who has fought in that country who did fully understand the position and the seasonal risk. Sennacherib, Mark Antony, Richard the First, and Napoleon all came to grief in this country, and probably for the reason given, namely, malarial infection, which is especially frequent in the autumn. Jerusalem in the autumn was notoriously dangerous.

Yellow fever was definitely proved to be due to another mosquito, and not to be due to direct contagion, by an experiment voluntarily conducted in 1900, thirty-two years ago, by a number of medical men and volunteers, with the loss of one life, that of Dr. Lazear, whose widow, so it is stated, was granted in the first instance a pension of £120 a year by the Government of the United States of America. He allowed himself to be bitten by an infected mosquito, knowing the risk, and was dead in seven days. It was this knowledge that enabled the Panama Canal to be constructed.

The Consulate of the United States in Melbourne, through Mr. Dye, kindly furnished me with the history of the Panama Canal, which is one of the greatest of medical monuments.

It was first conceived in 1551, but the first practical attempt was made by Lesseps in 1883. This failed, it having cost £53,000,000 to excavate eighty million cubic yards of earth. A second attempt was made in 1895, which also failed. There were contributing business reasons for the failure, but the main cause was disease, principally yellow fever and malaria. The United States then purchased the French interests for £8,000,000.

Colonel Gorgas was appointed and approached the matter in 1903 from the sanitary point of view and cut down the mortality ultimately from the French death rate of 35% to 2%. Yellow fever was practically eliminated by a number of technical measures and malaria was cut down to about one-third. It is generally agreed that without the elimination of yellow fever the work was impossible. The panic caused by yellow fever put an end to the work. Colonel Gorgas's success represents the most colossal example of the application of medical science to a vast commercial undertaking.

Military Medical Science.

During the war I learned in most practical form that military medical practice is vastly superior to anything known in civil life. I estimated that about one-third of the work of a medical officer was concerned with the prevention of disease, one-third to the treatment of disease and injury, which, incidentally, was most efficient, and one-third devoted to the careful classification of the partially disabled, who were, by cooperation with the combatant department of the service, placed in positions where they could be useful.

Every day a report was presented to the Commander-in-Chief indicating the number of men off duty and the reasons for their disability. If the number became great from any particular disease, immediate action followed. But in civil life there is nothing of the kind. The public health departments do something toward prevention, but not as much as they could do if they acted in intimate association with the whole medical profession. Furthermore, machinery for employing the disabled

does not exist. It seems to be no one's particular care.

Thus we find today well trained medical men doing the work of dealing with disease as efficiently as knowledge permits, not sparing themselves, whether their patients are rich or poor, and honouring the great Hippocratic oath, but there in the main the effort ends.

Success and Failure.

I now propose to indicate further what has been done and also to show what has not been done, and to indicate some of the methods by which effective action may be taken.

Sir Stephen Tallents, in *United Empire* for June, 1932, gives what he describes as the most authenticated figures with regard to malaria. Six hundred and fifty million people, that is, one-third of the population of the globe, suffer from malaria. Two million die annually, and in the British Empire seven million people are annually treated with quinine at the public cost of £650,000. Yet malaria is preventible, though no one knows better than I do the practical difficulties of the necessary methods. Much has been done, but the preventive work is very expensive. Before the war Jerusalem was a most dangerous place to live in, especially in the autumn, where the deadly form of malaria was called the "autumn disease". Under British administration, for which little thanks are given, it has been virtually controlled by closing the pools and by the provision of an open supply of running water in which mosquitoes cannot breed. Placing ducks on stagnant ponds is one item of successful action in some places.

If we had an infected indigenous population in Australia, we should be scourged with malaria from the Murray to the North Coast.

Typhoid fever has been eliminated practically by sanitation and a form of vaccination. Leprosy has practically disappeared from amongst the white races. Trachoma is rapidly disappearing in Australia. But certain diseases have not been controlled and are on the increase.

Quite recently an eminent specialist stated, apparently with pride:

> Twenty-five per cent. of the youth of this country (Scotland) are without tonsils and post-nasal adenoids. In Glasgow 22,500 children are admitted annually to the schools, and in school hospitals, general and special hospitals 6,000 cases are operated on for tonsils and adenoids.

That is to say, twenty patients are operated on on the average every working day in one section alone of the population of Glasgow. I am not suggesting that these operations are unnecessary, but I do definitely say that operations on such a scale do call for full scientific investigation into the circumstances that made them desirable. Presumably some of these people lost their lives or were seriously ill as the result of the operation, but that after all is relatively a side issue. Presumably the tonsils have been created for some purpose useful to their owner.

On the credit side we can furnish some remarkable figures. Table II shows the infantile mortality in Victoria and Australia from 1901 to 1931. With care the result should be even better, especially if the deaths in the first month of life can be controlled, that is, the neo-natal rate.

TABLE II.

Showing Infantile Mortality per thousand births in Victoria and Australia.

Year.	Victoria.	Australia.
1901	102·94	103·61
1902	108·60	107·15
1903	106·40	111·36
1904	77·92	81·77
1905	83·30	81·76
1906	92·92	83·26
1907	72·60	81·06
1908	86·05	77·78
1909	71·36	71·56
1910	76·88	74·81
1911	68·70	68·49
1912	74·48	71·74
1913	70·53	72·21
1914	78·27	71·47
1915	68·78	67·52
1916	74·63	70·53
1917	56·82	55·91
1918	61·75	58·57
1919	67·90	69·21
1920	73·70	69·14
1921	72·55	65·73
1922	53·35	52·74
1923	65·70	60·54
1924	61·32	57·08
1925	56·98	53·40
1926	55·68	53·99
1927	56·05	54·47
1928	55·63	52·96
1929	47·23	51·10
1930	46·61	47·24
1931	44·47	42·12

Table III shows the manner in which typhoid fever, which in 1880 was a veritable scourge, has been rendered almost negligible. This has been done by simple sanitation and has been assisted by the Australian habit of tea drinking. Typhoid fever is one of the water-borne diseases, and the boiling of water destroys the organism. When the towns on the inland rivers receive proper sanitation, the figures will be still smaller. During the great war this disease, once the destroyer of armies, was completely held in check by inoculation and by boiling the water or by chlorination, which is very effective.

TABLE III.

Showing Death Rates per million in Victoria and Australia from Typhoid Fever.

Year.	Victoria.	Commonwealth.
1907	74	137
1908	139	175
1909	104	155
1910	110	148
1911	71	109
1912	70	133
1913	69	119
1914	75	122
1915	55	113
1916	52	107
1917	44	57
1918	34	50
1919	22	52
1920	35	58
1921	44	64
1922	19	41
1923	34	43
1924	20	38
1925	11	29
1926	17	30
1927	17	26
1928	21	27
1929	11	17
1930	10	18
1931	14	—

Tables IV and V are most illuminating. With the general use of antidiphtheritic serum, obtained from the horse in vast quantities, the mortality has been greatly reduced, but the disease has not been checked and has in places and at times even increased. One possible explanation is that we save the patient, but leave him as a carrier who can infect others. Still, if people will take advice, methods are available for rendering those liable immune, and, so far as we can tell, this is the only means by which we can exterminate this disease. During the war the segregation of carriers became a serious matter because of the numbers involved. The carrier problem has not been solved. You cannot lock up all the carriers, and it is difficult to get them to be careful.

TABLE IV.

Showing Death Rates per million from Diphtheria in Victoria and Australia.

Year.	Victoria.	Commonwealth.
1907	79	98
1908	90	100
1909	71	102
1910	78	74
1911	181	155
1912	186	162
1913	173	168
1914	149	145
1915	142	141
1916	192	181
1917	111	131
1918	147	128
1919	143	112
1920	186	155
1921	179	168
1922	87	98
1923	54	69
1924	69	75
1925	42	46
1926	41	53
1927	54	63
1928	75	69
1929	57	72
1930	48	60
1931	72	—

TABLE V.

Showing Notifications of Diphtheria in the State of Victoria.

Year.	Number of Cases.	Case Mortality *per centum.*
1898	1,792	13·78
1899	1,634	10·80
1900	1,522	11·37
1901	1,700	10·18
1902	1,600	7·88
1903	1,345	8·62
1904	2,259	5·78
1905	1,209	7·28
1906	963	6·02
1907	1,670	5·87
1908	1,628	6·82
1909	1,590	5·60
1910	2,415	4·64
1911	5,120	4·63
1912	5,289	4·86
1913	5,367	4·56
1914	4,868	4·33
1915	4,463	4·55
1916	5,377	4·95
1917	4,092	3·74
1918	6,568	3·21
1919	4,007	5·27
1920	6,457	4·27
1921	9,458	2·91
1922	5,323	2·59
1923	3,467	2·71
1924	3,987	2·86
1925	2,631	2·7
1926	2,471	2·8
1927	3,254	2·9
1928	4,267	3·1
1929	3,256	3·1
1930	3,414	2·5
1931	5,434	2·4

Table VI indicates a favourable and a most disagreeable feature. The general death rate has fallen to a very low rate, but the cancer death rate is steadily rising, and though the rise may not be quite so great as it appears, the conclusion cannot be evaded that there is a definite increase.

TABLE VI.

Showing General Death Rates and Death Rates from Cancer in Australia.

Year.	Total Death Rate per thousand of Population.	Cancer Rate per million.
1907	10·99	713
1908	11·07	696
1909	10·33	728
1910	10·43	733
1911	10·66	739
1912	11·21	760
1913	10·74	747
1914	10·46	743
1915	10·59	743
1916	10·95	804
1917	9·71	813
1918	9·99	844
1919	12·69	851
1920	10·50	842
1921	9·91	874
1922	9·22	907
1923	9·89	892
1924	9·47	934
1925	9·20	923
1926	9·42	943
1927	9·45	933
1928	9·45	956
1929	9·55	981
1930	8·59	950
1931	8·70	—

In Table VII there are disclosed some facts of remarkable character which Dr. Cherry has elucidated and emphasized. Whilst the death rate from respiratory tuberculosis has steadily declined, that from cancer has risen to nearly the same extent, so that the two death rates added give a remarkably constant figure. As one rate falls, the other rises,

TABLE VII.

Showing Deaths from Respiratory Tuberculosis and from Cancer per million of Population in Australia.

Year.	Respiratory Tuberculosis.	Cancer.	Total for Respiratory Tuberculosis and Cancer.
1907	777[1]	713	1,490
1908	813[1]	696	1,509
1909	741[1]	728	1,469
1910	684	733	1,417
1911	677	739	1,416
1912	650	760	1,410
1913	647	747	1,394
1914	610	743	1,353
1915	598	743	1,341
1916	620	804	1,424
1917	557	813	1,370
1918	583	844	1,427
1919	648	851	1,499
1920	554	842	1,396
1921	567	874	1,441
1922	531	907	1,438
1923	535	892	1,427
1924	528	934	1,462
1925	505	923	1,428
1926	520	943	1,463
1927	491	933	1,424
1928	509	956	1,465
1929	471	981	1,452
1930	442	950	1,392
Totals for period of 24 years	14,258	20,049	34,307
Average per year	594	835	1,429

[1]Includes acute miliary tuberculosis.

NOTE.—Prior to 1921 "miner's phthisis" was included with respiratory tuberculosis.

and the relationship is too uniform to be a mere coincidence.

It will be noticed that the tuberculosis rate is now well below the average for the thirty-three years, whilst the cancer rate is well above it. Dr. Cherry's theory is well known, namely, that a subsequent infection with tuberculosis in resistant people is the indirect cause of cancer.

Table VIII shows that deaths occurring in the first month of life, called neo-natal deaths, are declining but slowly and that the Bush Nursing Association rate is less than half the State rate.

TABLE VIII.
Showing Deaths under One Month per thousand births.

Year.	Mortality Rate.[1]
1925	29·16
1926	29·45
1927	29·57
1928	28·15
1929	29·58
1930	28·0
1931	26·82

[1]Bush Nursing Association average for 1922-1931 was 13·91.

Table IX indicates the manner in which new causes of death appear. The slaughter from motor accidents is more than double the death rate from diphtheria.

TABLE IX.
Showing Accidents in Australia per one hundred thousand of population.

Year.	Motor.	Drowning.
1920	(n)	9·3
1921	(n)	10·3
1922	(n)	8·7
1923	(n)	8·4
1924	6·5	7·5
1925	8·7	8·8
1926	10·1	8·4
1927	12·1	9·6
1928	14·0	7·9
1929	15·7	7·7
1930	15·0	8·1
1931	12·5	5·3 (b)

(n) denotes "not available".
(b) If "open verdict" drownings are included as prior to 1931, the rates would be 6·7 for Australia.

Medical Anthropology.

I now leave these technical questions to deal with the question Dr. Trinca has recently put so aptly. As medical men we are dealing largely with the terminal products of faulty social adjustments. On any one day in any great city 1% of the population are under treatment for venereal disease. Yet venereal disease is entirely preventible by two methods: (i) universal early marriage, which, of course, involves entirely altered ethical conceptions and social outlook, and (ii) the use of certain medical sanitary measures, as adopted in the armies and navies with great success, by those who expose themselves to infection. Yet the venereal disease business goes on and loads our asylums, blind and deaf institutions, men's and women's hospitals and cemeteries with its victims. Why is it that we do not face the issue which has been so frequently and publicly stated?

Careful censuses show that venereal disease infection begins at about fifteen years of age and attains its peak in women at nineteen years of age and in men at twenty to twenty-one. Would it not be more sensible if we realized that we are dealing with an instinct of immense strength, secondary only to that of self-preservation? Consequently, we should build our social structure round it, recognizing the impossibility of repression, rather than seek the futile method of endeavouring to make this instinct subordinate to artificial social arrangements. Early marriage is clearly the ideal solution, and whilst it might bring with it some evils, they would be a bagatelle compared with the present unhealthy and disastrous arrangements—a blot on our civilization, and a very big blot at that.

Town Planning.

Air and sunlight are needed in homes, and ample spaces should be provided for outdoor recreation. Yet in the outer suburbs of Melbourne houses are crowded and there are wholly insufficient spaces in the open.

Table X indicates the lamentable result of lack of forethought.

Land taxation and rating play a serious part in producing crowding, but the main fault is the absence of a Town Planning Act. Why? Within ten miles of the Melbourne Post Office there is about half the open space which lies within ten miles of the Bank of England in London. Why? Certainly not for want of asking on the part of the Town Planning and Playgrounds Associations.

In London there are 16,200 acres within ten miles of the General Post Office, including Epping Forest, 5,660 acres; Richmond Park, 2,358; Hainault Forest, 805; Hyde Park, 364; Kensington Gardens, 279; St. James Park, 93; Green Park, 53.

Outside the ten miles radius there are: Bushy Park, 994 acres; Hampton Park, 820.

In Melbourne there are within ten miles of the General Post Office 6,600 acres: Albert Park, 566 acres; Yarra Bend, 315; Studley Park, 203; Royal Park, 451. Albert Park, Royal Park and other parks have been depleted of 860 acres since their establishment by the action of governments in selling or utilizing the land for other purposes.

Are these activities ever regarded as part of medical education? Yet is it not obvious that they essentially belong to it, if the large view be taken? National parks fall into the same category.

Canada has reserved for national park purposes an area of 12,000 square miles—about equal to half the area of Tasmania. Australia so far has reserved a total of approximately 2,180 square miles, divided up much as follows:

New South Wales	420 square miles
Victoria	253 square miles
Queensland	520 square miles
South Australia	200 square miles
Western Australia ..	551 square miles
Tasmania	238 square miles

Very few of the Australian parks are properly patrolled or protected, whereas in Canada the work is done systematically.

TABLE X.

Showing Reserves in the Metropolis for Parks, Gardens and Recreation.

Municipality.	Area in Acres.	No. of Reserves.	Area in Acres.			Cost of Purchase. £	No. of Cricket Pitches.	Playgrounds Equipped.	Public Tennis Courts.	Per cent. of Reserves.
			Crown Land.	Acqd. by Council.	Total.					
Melbourne	7,740	32	1,264	3	1,267		79	22	22	16·4
Blackburn and Mitcham	9,920	5	—	49	49	4,223	6	1	—	0·5
Box Hill	5,200	18	42	247	289	32,561	14	1	—	5·8
Brighton	3,332	20	167	85	252	38,234	26	5	9	7·6
Brunswick	2,719	26	13	66	79	16,834	7	3	—	2·9
Camberwell	8,320	46	13	249	262	60,565	54	9	28	3·1
Caulfield	5,600	14	235	91	326	23,369	30	2	9	5·8
Chelsea	3,040	8	85	21	106	5,760	3	—	—	3·5
Coburg	4,800	27	21	142	163	22,682	13	9	4	3·4
Collingwood	1,139	9	69	17	86	2,500	4	4	7	7·5
Essendon	4,000	29	56	241	297	48,536	20	11	—	7·4
Fitzroy	923	3	40	1	41	5,000	—	3	—	4·4
Footscray	3,982	21	89	42	131	7,917	15	10	2	3·3
Hawthorn	2,440	25	18	103	121	37,323	18	8	8	5·0
Heidelberg[1]	9,200	34	364	251	615	47,224	44	2	8	6·7
Kew	3,553	14	220	59	279	12,611	12	5	—	7·8
Malvern	3,989	32	30	236	266	39,675	23	3	9	6·7
Moorabbin	12,320	6	89	30	119	9,578	8	1	1	0·9
Mordialloc	3,500	6	117	25	142	9,960	5	1	—	4·0
Northcote	2,850	13	34	60	94	18,485	19	6	—	3·3
Oakleigh	2,658	10	48	14	62	4,071	6	—	—	2·3
Port Melbourne	2,366	9	42	—	42	—	3	1	—	1·8
Prahran	2,320	13	2	66	68	66,398	6	4	4	2·9
Preston	8,800	32	—	222	222	42,772	12	5	4	2·5
Richmond	1,430	7	224	1	225	3,023	15	3	—	15·7
Ringwood	5,546	8	27	69	96	3,650	3	—	—	1·7
Sandringham	3,740	9	167	34	201	9,594	8	1	—	5·4
St. Kilda	2,049	11	288	1	289	1,732	15	4	8	14·1
Melbourne South	2,303	8	501	½	501	2,519	46	3	19	21·7
Williamstown	2,775	13	100	7	107	2,750	18	5	13	3·8
Totals	132,554	508	4,365	2,432½	6,797	579,548	532	132	154	5·1

[1]Excluding Greensborough Riding.
Street plantations not included. The minimum requirement is 10% of open space.

(W. THORN, March 2, 1931.)

The tourist revenue in Canada constitutes her second industry in point of profit, yielding in 1929 £60,000,000 profit. Mankind, worn and wearied, seeks return to Nature. The number of visitors to the parks is given in the latest reports as about 500,000.

Yet all these deficiencies add their quota to the daily work of the medical practitioner in seeking to remedy the terminal results of social maladjustment.

What is the sense of training medical men at great expense to cure something which ought not to exist? And the remedy? In my judgement there is but one. By public education, using the driving force of the great body of medical men, let us alter the public outlook, when practical action will become inevitable. Once the public understands, opinion becomes operative; witness the hesitation now shown to effect the well known practice of "nibbling" at park lands and the attempt to save the wonderful Australian animals.

The Bush Nursing Movement.

Yet another change of vast importance has made its appearance. The Bush Nursing movement, initiated in 1910 by the Countess of Dudley, loyally supported by Lord and Lady Carmichael, has spread to all States. I now append an outline of its history indicating the rapid growth of Bush Nursing hospitals in Victoria, some beautifully constructed, staffed by the very best nurses, and providing accommodation both in quality and price unknown elsewhere. All these centres and hospitals have become baby health centres and also general health centres.

TABLE XI.

Indicating the History of the Victorian Bush Nursing Association.

Date Founded.	Number of Centres.	Number of Hospitals Built and Building.	Number of Ambulances.	Administration.
1910				Founded by the Countess of Dudley with the support of Lord and Lady Carmichael.
1911	4			
1913	13			First Superintendent appointed (Miss E. M. Greer).
1914	20			
1915	21			
1916	24			
1917 to 1920	28			
1921	33	1		Miss E. M. Greer resigned. Miss E. C. Cameron, A.R.R.C., appointed.
1922	39	2		
1923	47	3	Country Ambulance founded.	Miss M. Mathieson appointed as assistant.
1924	47	3	6	
1925	47	3	11	
1926	52	8	18	Miss E. C. Cameron resigned. Miss M. L. Gillis appointed.
1927	55	9	19	
1928	59	14	21	
1929	62	17	21	Miss M. L. Gillis resigned. Reorganization of administration; office of superintendent abolished. Office and Nursing Supervisor and a travelling Inspector appointed, owing to magnitude of work. Miss M. Mathieson, Office and Nursing Supervisor; Miss M. Edwards, Travelling Inspector.
June, 1930	68	25	22	
June, 1931	66	28	22	
1932	63	29	21	

It is estimated that 31 ambulances will furnish all the requirements of the State. There are 68 First-Aid and Stretcher Centres, in addition.

There are now thirty hospitals, with an aggregate accommodation of 300 beds, and the permanent nursing staff numbers 71.

The maternal mortality and infantile death rate for 1931-1932 were as follows: One death (maternal) in 945 cases, 19 still-births, 20 neo-natal deaths.

For the whole period, 1922 to 1932, the rates per thousand births were as follows:

Maternal death rate	1·96
State average	4·96
Still-birth rate	17·05
State average	29·70
Neo-natal deaths	14·94
State average	30·10

It is unlikely that so favourable a result can be obtained indefinitely. It is almost too good, when all the circumstances are taken into consideration, but the Association, through its excellent staff, will continue to do its very best and, as usual, every doubtful or disastrous case will be submitted to Professor Marshall Allan for report and advice for future guidance. Every effort will be made to maintain a record of which all concerned are justly proud.

It must be remembered that every death has been taken into account, including several cases for which the Association is not responsible, so as to avoid the suggestion of selection of cases.

The maternal and infantile mortality rates set out in the tables are unknown elsewhere in the Commonwealth and rarely heard of even elsewhere. Why should not the same efficient and economical system be extended to the cities?

One reason for the success of the Bush Nursing hospitals is the fact that they receive no government support for construction and practically none for maintenance, and consequently are free from the blighting influence of political control. The medical profession is now supporting them whole-heartedly, realizing what they mean.

A phase of this movement has escaped notice. If hospitals are decentralized in this way, the character of medical practice throughout the country must improve. Medical practitioners supplied with the best nurses and the best hospitals are certain to become more efficient and useful. Furthermore, each hospital becomes a general and baby health centre. Yet our nursing system is far behind that of Canada and England. In Canada there are four and in England two classes of nurses. In England trained nurses can go to the Universities of London or Leeds and take out a one-year course in basic science and then receive a diploma. In Canada this can be done for two separate classes of nurses, but in addition a five years' course is provided, leading to a degree in the science of nursing. Such women may become secretaries of hospitals, teachers *et cetera*. But the main issue is that the British and Canadian universities have formally recognized nursing as a profession and the Australian universities have not done so.

The Training of Nurses.

Australian bedside nurses are excellent, but there is no provision for the higher training. Nevertheless, educated women frequently consult me about the matter and are advised to go to England or Canada. Why do we lag behind? The greatest contribution to public health made by the United States of America is the public health nurse, specially trained for her work.

The Future of Preventive Medicine.

Now just a word on the future of preventive medicine. It is certain that increase of knowledge on the part of experts will not do what is necessary to conserve health and prevent disease. In other words, public education regarding the preservation of health includes such activities as town planning, playgrounds *et cetera*, and the prevention of disease means systematic education in the schools by qualified medical lecturers. The world has been left behind in relative ignorance whilst knowledge has been acquired by experts as never before, and the diffusion and gradual application of that knowledge is the need of the day.

It is poor consolation to the bereaved mother that her child could have been saved, had she understood how to feed it. It is still poorer consolation to the parents bereaved of children or rearing diseased children to know that venereal disease could be extirpated if we took the trouble to alter our social outlook.

Whilst, as stated, knowledge alone cannot prevent disease, it is also true that it cannot be prevented without knowledge, and a properly organized society would see to it that proper opportunity was given so that all responsible people would know just how the problem could and should be faced. It is therefore obvious that if the medical profession is to play the part it should in improving the structure of the social fabric, its outlook must be so altered as to include the activities mentioned and many others besides.

It must aim, like the Army Medical Service, at prevention, treatment and the adjustment in the social service of the partially disabled. It must try to devise means by which we can know on any one day the total number of sick, and the reasons for the sickness, and to keep an outline knowledge of what is mainly social failure. But as we cannot have army discipline, we must seek self-discipline and cooperation for a great objective. The United States of America have set a fine example by taking one day censuses of those suffering from venereal disease, and the method could easily be extended to other diseases. It requires only knowledge and a little energy.

Conclusion.

Before closing, may I allude to a vast problem. There is to me nothing so difficult as to read medical history, to try and divest myself of much that I know, and place myself in the place of these early men of science. When I read parts of Aristotle's work I find that had the facts been presented to me and had I the vision and wonderful outlook of that great figure, I should have reached the same con-

clusions: yet they are hopelessly wrong. He noticed, for instance, that if the heart became disordered or stopped its beats, death followed. He saw, having no microscope, that the first thing visible in a developing chick was the heart; therefore the heart was the seat of life. In the seventeenth century Harvey, with the newly invented microscope, saw that blood appeared before the heart, therefore blood was the seat of life. Reasonable conclusions enough, in view of what was then known, but now known to be quite unsound. But we can be sure that we are making similar mistakes in practice and that a future generation will look back on us, just as we look back on our forefathers in science. Someone may find out that a quarter of the youth of Scotland need not have had their tonsils removed and may even find out that in many cases it was worse than useless. They may even find that tonsils are useful.

The advances in our knowledge, great as they have been, only render our original ignorance the more clearly visible. The alkalinity of the blood is maintained with extreme accuracy, but how or why we do not know. A small variation would end life.

We use our eyes when looking from the far to the near by a remarkable mechanism, but at least half a dozen different methods are employed in the animal world, and in some cases the method and structure are better than in man.

Similar instances occur in other directions. Belladonna, that is, a 1% atropine solution, applied to the eye dilates the pupil, and we have found that this and other drugs can enter one small part of the eye, though nothing can come back. The pupil is affected by atropine if the solution is of the strength one in fifty million parts. What does this extraordinary business mean?

We know not whence we came, why we exist, or why these extraordinary and intricate changes go on in our bodies. So extraordinary are they that one sometimes wonders why life continues. So far, there is only one answer: that the human mind is quite unable to form even a conjecture respecting this vast puzzle. The practical conclusion, however, is that we should zealously preserve types of every animal and plant on the globe, for we never can tell when they may tell us something important.

May I, before concluding, again emphasize the fact that though thirty-five years ago Ronald Ross showed us how malaria could be extirpated, nevertheless today 650,000,000 people are infected. Also that though we know exactly how venereal diseases could be completely eliminated from the globe, the necessary action is not taken. The knowledge is available, but until biological education is made available far more thoroughly to the man in the street, the necessary measures will not be taken.

Professor Halford's scientific method of facing the fundamental facts must be adopted by the human family before these salutary changes are made.

It must be clear to all that we have travelled a long way indeed from the foundation of a medical school in a shed in Madeline Street, Melbourne, in 1863, only sixty-nine years ago. Nevertheless, the ideals of its illustrious founder and the methods he employed are as sound today as they were then, though the problem has become far more complicated by the increasing specialization of not only medicine, but also of the social structure. It will, as time goes on, become increasingly complex, and yet we must adhere to the principles he stated so clearly.

I have done my best to do justice to the memory of a man who saw life as a whole, and saw it with extraordinary clarity of vision and who equally recognized that the remedy for a large portion of the sorrows and difficulties of life lay in the production of a most highly trained medical profession, comprising a body of gentlemen endowed with the ideal of Hippocrates.

All honour to the memory of such a distinguished pioneer along the difficult and weary road that leads to social sanity.

Acknowledgements.

My best thanks are due to the Commonwealth Statistician, Professor Giblin, and to the Victorian Statist, Mr. Laughton.

OBSERVATIONS ON THE MOVEMENT OF CELLS IN VITRO WITH REFERENCE TO TUMOUR IMMUNITY.[1]

By WARNFORD MOPPETT, M.D. (Sydney),
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IN a previous communication (*Proceedings of the Royal Society*, Series B, Volume CVI, page 175) it was shown that lymphocytes migrating from a fragment of spleen *in vitro* would move in response to a concentration gradient, to the higher concentration if the medium were isotonic, and in the opposite direction if the concentration were sufficiently high to be harmful. In general the cells behaved as if they were endowed with an intelligent appreciation of the circumstances of their environment, and the test was exceedingly delicate.

The present work on the migration of tumour cells *in vitro* was inspired by the work of Lumsden on the humoral antibodies to implanted tumours (*The Lancet*, January 15, 1927, page 116).

Procedure.

The diffusion vessel employed has already been described in connexion with the spleen work (Figure I). A drop of blood was placed in each reservoir and the whole apparatus was filled with saline solution. It was assumed that with clotting and subsequent shrinkage the antibodies would diffuse out to establish a gradient of concentration or titre

[1] This work was carried out under the control of the Cancer Research Committee of the University of Sydney with the aid of the Cancer Research and Treatment Fund.

in the central passage, while blood corpuscles were conveniently retained in the fibrin network.

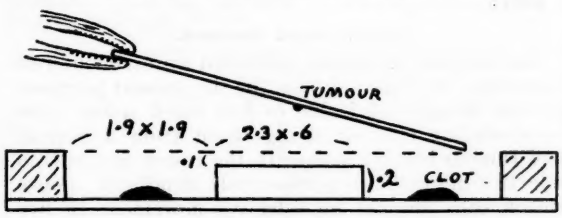


FIGURE I.
The preparation is finally completely sealed with paraffin of low melting point. One alternately closes the "cancer" and "normal" end first to avoid possible errors due to initial fluid displacement.

A fragment of mouse sarcoma, S 37 of the Imperial Cancer Research Fund, was placed on a long coverslip and inverted on to the vessel. For this simplified procedure the vessel must contain just the right amount of fluid, and the coverslip (of strong glass) must not completely cover the reservoirs. The final paraffin sealing then follows any irregularity of the exposed fluid. Cells are not unduly spread out, but as before a preliminary drawing and an observation after two and twenty-four hours' incubation are necessary with the minimum of mechanical disturbance.

Experiments.

The heart was removed from a mouse bearing a large tumour and drops of blood were placed in one reservoir (of three sets of apparatus on an average) and blood from a normal mouse was placed in the opposite reservoir. Measurement of such small quantities would be difficult under the circumstances, but results appear to show that one could attain sufficient uniformity of size by visual estimation. In the first series (Table I):

(1) The tumour was taken from the mouse supplying the (tumour) blood and positive movement or a selective movement to the tumour blood was observed in the majority of experiments. Figure II shows such a result, the cells being symmetrical about the fragment at the outset. (The reliability factor would be higher if early experiments were eliminated.) Later checks have shown that movement is sometimes obtained in the opposite direction, negative, under these circumstances. This is possibly associated with extensive necrosis in the tumour [see (7) below]. The next five lines in the table record control experiments to establish the following:

(2) A considerable disparity in size of drops will vitiate the result. (When the respective volumes and surface areas differ approximately by a factor of two.)

(3) A unilateral leakage through defective paraffin sealing will produce a cell movement, presumably through an interference with saline concentration as the water evaporates.

(4) Drops of similar size and kind (normal) cause no migration apart from the centrifugal movement from the fragment.

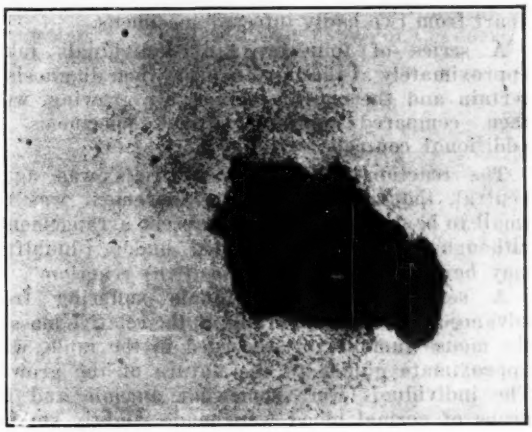


FIGURE II.
Migration to left from an initially symmetrical position.

(5) (6) A unilateral specimen of tumour or normal blood causes a migration thereto. For convenience tumour blood is always recorded on the right of the table, but in actual experiments the arrangements were frequently reversed to avoid errors through initial fluid displacement.

(7) It was thought advisable to repeat the first series, taking the blood from a different animal to that supplying the tumour fragment, and this gave the unexpected result of (negative) movement away from the tumour blood.

(8) Some mice were available which had been cured of the tumour by means of radiation and by the disappearance of a coexisting untreated tumour they were apparently immune. ("Differential Action

TABLE I.
(Total slides observed: 114. Average: Three to animal, that is, 38 separate sets of one, two or three mice.)

Blood: Left Reservoir.	Positive to Right.	Negative to Left.	Neutral.	Doubtful.	Abandoned. (Infection *et cetera*.)	Reliability.	Blood: Right Reservoir.
(1) Normal ..	26	0	2	6	7	26/34	Tumour. (Same mouse.)
(2) Normal large drop	0	4	2	0	0	6/6	Tumour. (Same mouse.)
(3) Normal leakage	0	4	0	1	0	4/5	Tumour. (Same mouse.)
(4) Normal ..	0	0	6	0	0	6/6	Normal.
(5) Normal ..	0	5	0	0	0	5/5	Blank.
(6) Blank ..	4	0	0	1	0	4/5	Tumour. (Same mouse.)
(7) Normal ..	0	17	0	2	6	17/19	Tumour. (Different mouse.)
(8) Normal ..	0	2[1]	19	0	0	19/21	Cured tumour.

[1]Slight—blood taken from an animal before retrogression of tumour was complete.

X-Rays": Part VI, *Proceedings of the Royal Society*, Series B, Volume CX, page 172.) This blood caused no selective movement (neutral) except in the interesting slight (negative) reaction from an animal whose blood was taken before retrogression was complete.

Clinical Experiments.

The above results were so promising that some clinical material was tried as the basis of a future diagnostic test. First, a series of seven pairs of normal individuals was used as a control to demonstrate a neutral reaction (Table II). The same mouse tumour was used and four slides were prepared in each case. The results were consistent apart from two badly infected specimens.

A series of four pregnant individuals taken approximately at the third month, when diagnosis is certain and the chorion is actively growing, were then compared against normal specimens as additional controls.

The reaction of the tumour cells was again neutral, that is, any selective movement was too small to be detected with the present arrangements, although one patient recorded under (doubtful) may have shown a slight (positive) reaction.

A series of ten individuals suffering from advanced cancer (comparable to the relative mass of the mouse tumours) is recorded in the table, with approximate guides to the nature of the growth. The individuals were somewhat anæmic and the drops of normal blood were made slightly smaller as a precaution which, as it happened, weighted the conditions against the expected result.

One result was lost through infection, and eight showed a distinct "negative" reaction similar to the "heterologous" mouse blood.

One individual showed a positive reaction like "homologous" mouse blood, and this was not an abnormality of the normal blood, as the donor (a nurse) was tested against two of the above "negative" series. Otherwise each batch of normal blood was taken from a different individual. (Blood was taken from a finger and estimated visually in the "cancer" and "pregnant" series to conform to hospital rules. The "normal" series was taken from a vein.)

Miscellaneous Remarks.

The sarcoma fragment exhibited an excellent cell migration in saline solution for the present purpose. It was thought advisable to test chick spleen cells in a similar manner, using blood from a normal and tumour-bearing mouse in the reservoirs, but no selective migration was observed. Similarly, mouse spleen cells showed no selective movement in five consistent experiments.

The interpretation of tumour cell movement was easy in the example illustrated (Figure II), but on other cases it would have been difficult but for the previous experience with saline solution and spleen cells.

The present results showed much smaller displacement, but it appears that a cell will travel more easily along the track taken by another cell leading to a lined appearance of the outgrowth, probably associated with the removal of residual greasy substances from the glass surfaces.

The diagnosis of selective movement (checked by obvious cases of migration) was made by the appearances of these "lines" sweeping round the angles of the fragment to curve in a particular direction.

Figure III is an extreme case of growth from one portion only of the fragment, and the straight line

FIGURE III.—Neutral.

appearance indicates a neutral reaction. (The following figures are diagrammatic and such

TABLE II.

(Total individuals—pairs—used for experiment given in parentheses.)

Blood: Left Reservoir.	Positive to Right.	Negative to Left.	Neutral.	Doubtful.	Abandoned. (Infection *et cetera*.)	Reliability.	Blood: Right Reservoir.
Normal	0	0	26 (7)	0	2	26/26	Normal.
Normal	2	1	9 (3)	3 (1)	1	9/15	Pregnant.
Normal		4 (1)	—	—	—	4/4	Melanotic sarcoma.
		2 (1)	—	1	1	2/3	Malignant tumour of abdomen and abdominal wall.
		3 (1)	—	—	—	3/3	Secondary carcinoma of bowel.
		4 (1)	—	—	—	4/4	Recurrent epithelioma of vagina.
		—	—	—	4 (1)	—	Malignant growth of uterus.
		3 (1)	—	1	—	3/4	Carcinoma of vagina.
	3 (1)	—	—	1	—	3/4	Secondary breast carcinoma in lung and humerus.
		3 (1)	—	1	—	3/4	Carcinoma of stomach.
		3 (1)	—	—	1	3/3	Carcinoma of pelvis.
		3 (1)	—	1	—	3/4	Carcinoma of pelvis.
	(1)	(8)			(1)	(8/9)	Total cancers.

extreme examples would be recorded as doubtful (?) in actual practice.) Figure IV, a similar case of irregular growth, exhibits a distinct migratory drift to the left.

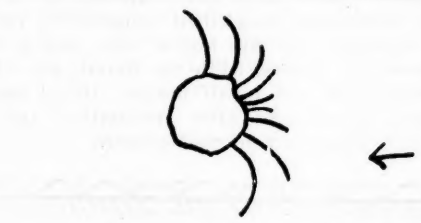


FIGURE IV.—Migration to left.

A possible cause of the curved path appearance was the distortion of the concentration gradient by a large fragment according to Figure V.

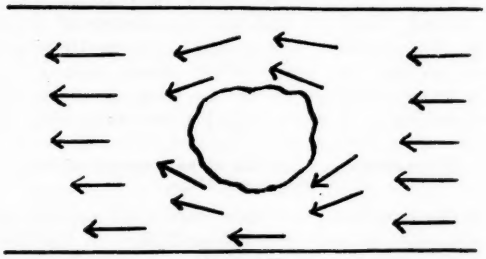


FIGURE V.

This proved to be wrong, because sixteen preparations were made with very small tumour fragments, and samples of mouse blood were adjusted to give very slow movement, resulting in the production of some excellent curved paths.

The appearance may be explained by assuming that the concentration gradient (uniform over the distance under consideration) causes a uniform velocity of migration in the cells and superimposed there is a directive force causing movement from the fragment at a velocity which varies with the distance covered.

For example, if both velocities were constant, there could be no curves and a symmetrical outgrowth would be distorted, as in Figure VI. In

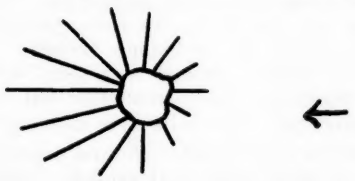


FIGURE VI.

certain examples of plasma and serum cultures the cells are distributed as far as possible apart, as if repelling one another, and it is possible that the centrifugal velocity may increase for a time with the distance. In the present instance there is no room for doubting the more obvious inference that the centrifugal velocity diminishes approximately as the square of the distance from the fragment.

Professor Wellish has kindly given me the following solution for compounded movements, considering the problem in two dimensions:

$$r^2 \sin^2 \theta + (2k/V) \cos \theta = \text{constant}$$

where r and θ are polar coordinates and V is the uniform velocity due to the gradient of antibodies and k/r the value of the centrifugal movement. This predicts an infinite velocity at the origin, but the path within the fragment is only virtual and the curve is plotted in Figure VII, where the radius of the fragment is the initial value of r (unity) and σ is the initial value of θ. Experimental conditions are not such as to permit a rigid test of the curve, but the general correspondence is good.

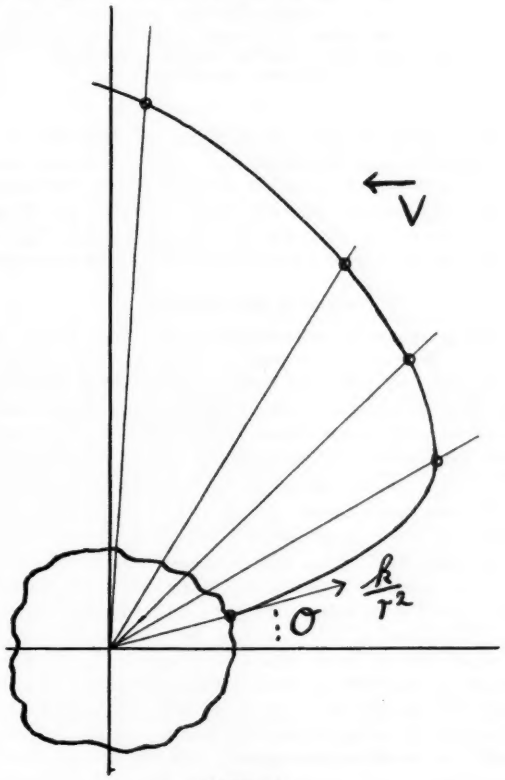


FIGURE VII.

Conclusions.

The experiments with the blood from cured and immunized mice provide an interesting link between the early work on migration quoted above, my experiments on the X ray treatment of tumours, and Lumsden's serological work. It might be supposed that the hypothetical antibodies must possess a high diffusion velocity comparable with sodium or chlorine ions for the experiment to succeed in the observation period, but they are brought to the vicinity of the fragment initially by withdrawing a little saline solution. The results in Table II do

not as yet establish a practical "cancer test", but with larger measured quantities of blood there is every prospect of success. Such work is now proceeding, but there is a general biological significance in the similarity of reaction between the implanted mouse sarcoma and spontaneous human tumour.

Acknowledgements.

I wish to thank Professor J. S. Windeyer, Dr. M. S. S. Earlam and Dr. R. Trindal for access to clinical material.

THE EFFECT OF X RAYS ON THE BLOOD AND SPLEEN OF WHITE MICE: A PRELIMINARY INVESTIGATION.

By G. BOURNE.

(From the Department of Radiology, Perth Hospital, and the Department of Biology, University of Western Australia.)

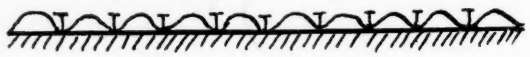
THE brief outline given here of the effects of X radiation on the blood and spleen of white mice is an account of a series of preliminary investigations conducted during 1931 at the Radiology Department of the Perth Hospital and Biology Department of the University of Western Australia.

Material and Methods.

The animals for experiment were white mice. The source of irradiation was a "Metalix" water-cooled deep therapy tube, worked at a constant potential of 190 kilovolts. The current was four milliampères and was valve-rectified. The screens were one millimetre of aluminium and 0·5 millimetre of copper. The target distance was 50 centimetres.

Twelve mice were irradiated in three batches. Three of these mice were irradiated in white pine boxes 10·0 by 10·0 by 12·5 centimetres (four by four by five inches); the pine being 1·25 centimetres (half an inch) thick, the rays had to pass through this thickness of wood before they reached the mice. One of these three mice was given 25 minutes' exposure, one 50 minutes, and a third 75 minutes. Only the spleens of these mice were examined. Five mice were irradiated for two hours and were spread-eagled on a white pine board, with the dorsal surface uppermost, and were irradiated directly. Three of this batch of mice were white in colour and two brown. One brown and one white mouse had their spleens protected by a three millimetre lead screen. From the mice blood smears were made before and after irradiation, and the spleens were examined microscopically after irradiation. Four mice were killed eighty hours after exposure and one was allowed to die (this occurred one hundred hours after the experiment). The final batch of mice were four in number and were irradiated beneath celluloid covers which were used for holding them still while the experiment was in progress. The arrangement used is shown in the accompanying diagram and was suggested by Mr. D. C. Copping, radiographer at the Perth Hospital.

The mice were pushed into the corrugations in the celluloid and the ends of the corrugations were then sealed. These mice were exposed for fifteen minutes. One mouse was killed immediately following the exposure, one five hours later, and a third after twenty-two hours, while the fourth was killed after forty-seven and a half hours. Blood smears were made before and after irradiation and the spleens were examined microscopically.



Observations on the Mice Following Irradiation.

None of the mice showed any ill effects directly after the irradiation, but in every case about twenty-four hours following exposure they remained less active and remained huddled in a corner of the box. From this position they would occasionally rise and creep around the box. After about twenty hours they remained huddled in the same position until, provided they were not killed before this, they died.

Observations on the Blood and Spleen of the Irradiated Mice.

In the first batch of three mice the spleen alone was examined and it was found that in the mouse receiving 25 minutes' irradiation and that receiving 50 minutes' irradiation there was no definite change in the spleen, either in the nature of increased pigmentation or in the destruction of splenic tissue. In the mouse which received 75 minutes' irradiation it was found that there was a very large increase in neutrophile polymorphonuclear cells; there were approximately twenty in a field, while in the spleens of the other mice there were only one or two in a field. The nuclear lobes of the polymorphonuclear cells indicated a shift to the right of the differential polymorphonuclear count. There was in addition increased pigmentation of the spleen.

In the batch of five mice which were next irradiated, the pre-irradiation blood smears were similar, showing no pathological cells and including polymorphonuclear cells, lymphocytes, and a comparatively large number of monocytes. This larger percentage of monocytes appears, however, to be rather characteristic of mouse blood. The post-irradiation smears showed a general leucopenia; lymphocytes and polymorphonuclear cells were rare, and the principal white cells were monocytes.

The spleens of these mice showed a uniformity in the type of white blood cell present. Mononuclear cells (including lymphocytes and true hyaline mononuclear cells) were predominant. The spleen of the mouse allowed to die from irradiation was much reduced in size and was very flaccid.

The final batch of mice also yielded similar pre-irradiation smears with a high lymphocyte and moderate monocyte count. The post-irradiation smears showed a continuous rise in the relative

numbers of lymphocytes and a continuous fall in monocytes. The polymorphonuclear cells at first increased, reaching their maximum five hours after irradiation, and thereafter they decreased gradually until in the mouse which was killed forty-seven and a half hours after irradiation, none were observed in the smears. There was a general leucopenia in the blood of all mice. The spleen of the mouse killed immediately following exposure was normal, that of the mouse killed after five hours showing an increase in polymorphonuclear cells corresponding with their rise in the blood. In the mouse killed twenty-two hours after exposure the number of polymorphonuclear cells had decreased and disintegration of the lymphoid tissue with increased pigmentation had commenced. In the mouse which was killed forty-seven and a half hours after irradiation, no polymorphonuclear cells were to be seen and pigmentation and destruction of the lymphoid tissue in the spleen had proceeded further.

Discussion.

Perhaps the most interesting result of these preliminary investigations was that no difference could be observed in either blood or spleen of the second batch of mice, two of which had the spleen protected by three millimetres of lead. This result agrees with that of Strumia, who found that he obtained beneficial results in myelogenous leuchæmia by irradiation of the soles of the feet. The fact that there was no difference in the blood reaction in white furred and brown furred mice is also of interest.

The deposition of pigment in the spleen and the destruction of the lymphoid tissue following irradiation are well known facts and have been demonstrated by a number of workers.

The decrease in polymorphonuclear cells relative to the other white cells is worthy of note, as is also the fact that the spleen polymorphonuclear cells constitute a comparative index of the number found in the blood. From this work also it appears that the lymphocyte is not always the most radiosensitive cell in the blood, as is postulated by some authors.

Acknowledgement.

I am indebted to the staff of the Radiology Department of the Perth Hospital for their assistance and sympathy with this work.

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Reports of Cases.

FAUCIAL DIPHTHERIA ASSOCIATED WITH PURPURA HÆMORRHAGICA.

By RUSSELL N. HOWARD, M.D. (Melbourne),
Medical Superintendent, Children's Hospital, Melbourne.

L.P., A FEMALE, aged twelve years, was admitted to the Children's Hospital, Melbourne, on May 14, 1932, with the following history. Illness commenced twenty-four hours before admission with the gradual onset of bilateral lumbar pain, followed by the passage of urine which appeared grossly blood stained. At this period she vomited slightly. A few hours before admission numerous petechiæ developed all over the body.

The child had been perfectly well prior to the onset of this disease, with no history of bleeding. Menstruation was not yet established. The family history was clear.

Examination revealed a temperature of 36·7° C. (98° F.), a pulse rate of 88, and a respiratory rate of 24. Small petechiæ were distributed evenly and profusely over the skin. The right tonsil showed a very hæmorrhagic condition, with a few discrete whitish spots on it of what looked like exudate.

The urine was grossly blood stained macroscopically, and microscopically showed red blood cells in profusion, with a corresponding number of polymorphonuclear cells. No casts were seen. Albumin was present roughly in proportion to the amount of blood.

The heart size and sounds were normal. The ocular fundi were normal.

Blood examination revealed 2,300,000 red cells per cubic millimetre and 7,600 white cells per cubic millimetre.

The film was normal, the bleeding time was twenty-five minutes, and no platelets were seen (Olaf-Thomson).

The spleen was not palpable and, perhaps most important of all, the child did not appear ill, but merely somewhat anæmic.

On the blood findings and general examination findings the case was regarded as one of *purpura hæmorrhagica*, and as a precaution a swab was taken from the indefinite patches on the hæmorrhagic right tonsil.

On the following day the petechiæ had increased in number, the patches on the tonsil had become confluent, bilateral tonsillar cervical adenitis with some periadenitis had developed, and from the swab a pure culture of diphtheria bacilli had been grown. The child still did not appear nearly as ill as would be expected of a child in whose blood was circulating enough diphtheria toxin to cause such gross capillary damage. Twenty thousand units of diphtheria antitoxin were administered.

The following day the child appeared a little more ill, but the throat lesion appeared stationary. The next day (fifth day of illness) the membrane had increased in thickness and had spread slightly. Twenty thousand units were again administered.

On the sixth day the membrane had spread as far as the right side of the uvula, but the glands in the neck were decreasing in size. The child seemed fairly toxic. A third dose of 20,000 units was given.

From this time convalescence proceeded fairly satisfactorily. The membrane slowly separated and the enlargement of the glands completely subsided. A mild degree of cardiac dilatation developed and later subsided. The hæmaturia ceased about the twelfth day, the albuminuria ceasing at the same time. An attack of *otitis media*, with resultant otorrhœa, was successfully negotiated.

During the first ten days of the illness there was a gradually rising, swinging temperature (maximum 39·4° C. or 103° F.), which fell in the same way to normal on the tenth day. The remainder of the disease was afebrile, except during the attack of *otitis media* on the thirteenth day.

A month after the patient's admission to hospital all the blood findings previously recorded had returned to normal. The child was discharged as cured five weeks after admission.

I report this case because it seems to me to present some interesting problems.

First, it seems impossible that the child was suffering from uncomplicated hæmorrhagic diphtheria. I have seen such cases. All the patients have been extremely toxic and ill, none have had gross hæmorrhagic tonsillar changes, and all have had, at the onset of purpuric symptoms, marked diphtheritic faucial lesions. Again, I cannot find records of a case of hæmorrhagic diphtheria with blood findings typical of *purpura hæmorrhagica*. These considerations suggest to me the possibility of a concurrence of the two diseases, the diphtheria occurring in a purpuric subject in a potentially active purpuric period and initiating a *purpura hæmorrhagica*. This would, I think, be somewhat in accord with recent views on the ætiology of this disease.

Another interesting feature is the slow progression of the diphtheritic faucial lesion despite fairly intensive antitoxic treatment. The usual experience, I think, is that after spread of membrane has been checked by antitoxin, membrane peels off without a further dose being needed, and certainly not two more doses.

All this antitoxin was given intramuscularly, and there is no reason to suspect any lack of absorption.

Reviews.

THE CORONARY ARTERIES AND THEIR DISEASES.

A QUOTATION from Emerson heads the modest preface to "Diseases of the Coronary Arteries", by Dr. D. C. Sutton and Dr. H. Lueth.[1] It is to the effect that every book is a quotation and that every man is a quotation from all his ancestors. The senior author apparently intends this to apply to himself, but it could be more truthfully said of his subject. His attempts to produce a work easily read by the general practitioner and yet not without profit to the cardiologist have been successful—a most difficult attainment. This result is partly due to the brief, concise and yet adequate arrangement of subsections of the chapters, the simplicity of semeiology and the large, clear type, printed on art paper. The arrangement of chapters is original: symptomatology, physical examination, anatomy, pathology, physiology, pharmacology and treatment are dealt with in this order. The authors are already known as successful workers in experimental cardiology, and the reader at once realizes that he is harkening to someone at grips with both the clinical and laboratory problems of his subject.

The first ninepin presented to the critic occurs in the title, namely, the use of the term "myocarditis" to express changes usually accepted as being wholly ischæmic. The authors themselves comment on this term, quoting as protagonists for its continuance Vaquez and Auchard; they contend that, apart from the common acceptance of the term, there may indeed be some fibrosis from a direct toxic action, with a degree of secondary vascular change. Coronary thrombosis is well discussed, as would be expected. The rational viewpoint of British clinicians is accepted, that the marked differences in symptomatology in individual cases are due to the differing degrees and character of collateral coronary circulation and that undue prolongation of pain is caused by a slow retrograde thrombosis involving branch after branch given off on the proximal side of the initial occlusion. The paucity of non-syphilitic *angina pectoris* in labourers is rationally explained by a good collateral circulation, developed during many years of hard physical work. Allbutt's theory of the aortic origin of *angina pectoris* is effectively dismissed and reference is made to the authors' own work on conscious dogs, when unmistakable evidences of pain followed artificial coronary compression, while pain was completely absent on traumatizing or distending the aorta. The authors are not prepared to deny the possibility of coronary spasm, but point out that it is unnecessary as an explanation for pain or delay in the acquirement of "second wind", as these conditions are more possibly due to a failure of the vessels to dilate. This point of view is more in keeping with the presence of perivascular infiltration and fibrosis, so consistently found. It is refreshing in the remarks on symptomatology to notice that the occurrence of frequent extrasystoles or paroxysmal tachycardia after the age of forty years is not dealt with as lightly as has been the custom. Every thinking clinician will condemn with the authors the term "pseudo-angina" as a false refuge, deceiving patient and doctor alike. Prognosis in *angina vera* is decided according to the electrocardiogram and the effect of a purine derivative called "Theocalcin". If this fails to relieve the condition, the outlook is changed from hopeful to uncertain, and to worse if the condition is unrelieved by the more powerful theobromine compound "Euphylline". If even nitrites fail, the condition is considered hopeless, even if it has not yet progressed to complete occlusion. These three drugs have found great favour with the authors, and since their pharmacology has received the fullest investigation, the method appears as sensible as it is simple. They admit, nevertheless, that any such forecast can be but approximate at the best. The relationship in the individual patient of angina to osteoarthritis, and an adequate differential diagnosis between these two conditions are stated, emphasis being laid on the steady ache of spondylitis aggravated by movements of the spine. With regard to the vexed question of prognosis following coronary block, the authors quote Connor's and Levine's figures of a 5% immediate mortality and confirm their statement that the severity of the symptoms offers no guide and that bundle branch block is an ominous sign. In the discussion on the results of physical examination the impression is left that a high blood pressure is almost invariable at some time in coronary sclerosis; this is not a commonly held viewpoint. The chapter on anatomy is taken from Gross's monumental book and that on physiology and pharmacology is a surprisingly condensed summary of an enormous literature and contains many accounts of the authors' own good work. The first paragraph of the chapter on treatment contains these words, which should become the cardiologist's private motto: "The important element at which treatment is directed is not cure, but the attainment of circulatory improvement through medication, and the adaptation of the individual to his reserve, physically, psychically and socially." Doubt is expressed as to the value of lowering high blood pressure in coronary disease, a conclusion which has been slow of acceptance. Digitalis dosage is discussed and a much required criticism given of the confusion existing in the minds of clinician, pharmacist and patient as to the relationship between drops and minims; wherefore these authors employ dried leaves. No mention is made of severe headache as a symptom of overdosage with digitalis. Guanidine is not advised for fibrillation due to this type of disease, because of the necessity for its continuance and the knowledge that fibrillation does not decrease coronary flow. Tobacco and alcohol in small doses are uncondemned, an example of the sound common sense and pharmacology displayed throughout this well prepared work. The illustrations are excellent, especially the coloured plates of cardiac infarction, but the electrocardiograms are not up to the same standard in reproduction.

[1] "Diseases of the Coronary Arteries (Myocarditis)", by D. C. Sutton, M.S., M.D., and H. Lueth, Ph.D., M.D.; 1932. St. Louis: The C. V. Mosby Company. Super Royal 8vo., pp. 163, with illustrations. Price: 32s. net.

HYGIENE.

THE fact that "Elementary Hygiene for Nurses", by H. C. Rutherford Darling, has reached its fifth edition, indicates the well deserved popularity of this work.[1] The book deals clearly with practically all phases of elementary hygiene, including chapters on food and the dietetic treatment of diabetes.

The subject matter is well arranged, the illustrations are good; in fact, the whole presentation of the subject is excellent. Although meant by the author to be of assistance chiefly to nurses, it will be equally helpful to medical students and junior practitioners, and can be warmly recommended.

[1] "Elementary Hygiene for Nurses: A Handbook for Nurses and Others", by H. C. Rutherford Darling, M.D., M.S., F.R.C.S., F.R.F.P.S.; Fifth Edition; 1932. London: J. and A. Churchill. Crown 8vo., pp. 326, with 58 illustrations.

The Medical Journal of Australia

SATURDAY, DECEMBER 10, 1932.

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MODERN OPTOMETRY.

NEITHER for medical nor for non-medical readers is it necessary to emphasize the importance of the conservation of eyesight and the responsibility resting on those charged with the care of the eyes. Blindness is not only a personal tragedy, but an economic problem. Between blindness and normal sight there is a wide range of defects, and these have a far-reaching influence on the whole organism and particularly on the central nervous system. To non-medical people defective eyesight is often nothing more than an indication for the wearing of suitable spectacles. In many instances this view would be correct. Medically trained people, on the other hand, know that pathological conditions of the eye often have a very insidious onset and that treatment is likely to be of most value when it is undertaken in the early stages of the conditions. Moreover, they know that the earliest signs of such diseases as diabetes and nephritis, of cerebral conditions, and of those due to focal sepsis are written on the ocular fundus. If the early signs of pathological change are not discovered and if the writing on the wall of the ocular fundus is not recognized, some measure of permanent ocular disability is likely to result and systemic disease may progress to an advanced stage before it is treated. The discovery will not be made nor will the writing on the wall be read unless the affected eyes are examined by someone who is familiar with the manifestations of disease in all its aspects and who understands its pathogenesis. Further, no understanding of disease can be gained by those who are ignorant of the physiology and anatomy of the human body.

The Institute of Optometrists of New South Wales has recently held its Tenth Optometric Convention. The convention lasted four days and the programme shows that the lectures delivered to members covered a wide range. The subjects included: "The Theory of Blood Pressure and its Relation to Optometry", "Muscular Anomalies and Their Treatment", "Blood Pressure" (a clinical demonstration, showing its practical application in the consulting room), "Dental Sepsis and Pathology in Relation to Eye Trouble". Optometry is a skilled occupation and some optometrists are highly skilled in their work. Under existing conditions optometrists certainly have a place in the scheme of things. Incidentally it might be stated that their place has been made larger and their occupation of it more secure by the casual or hurried way in which some busy ophthalmic surgeons, particularly among the seniors, treat patients whose only disability is an error of refraction. Although some optometrists are expert in the estimation of a refraction and can correct it by ordering suitable spectacles, no optometrist is competent to diagnose either the presence or nature of ophthalmic or systemic disease. We have yet to learn that training in optometry includes either a grounding in the physiology and anatomy of the body or an adequate course of instruction in pathology, medicine and surgery. Until this state of affairs exists, in other words, until optometrists are trained along lines similar to those adopted in the training of medical practitioners, we cannot allow that they are qualified to diagnose disease. If optometrists were conscious of their limitations and did not try to exceed them, and if every person who consulted an optometrist knew that he or she ran the risk of the non-discovery of some pathological condition, other than mere refractive error, which might be partially or wholly responsible for his or her visual disability, there would be little reason for protest.

Putting on one side for a moment the attitude of the public, we would point out that optometrists are not prepared to recognize their limitations. The titles of the papers read at the recent convention show that its members regard themselves as competent to discuss far-reaching questions of general medicine. One speaker is reported in *The Sydney Morning Herald* as having stated that: "The foundations of modern optometry must be laid on understanding of the general principles and practices of medicine." Another speaker is reported in the same journal as having stated, while discussing eyes and blood pressure, that: "The optometrist may thus act at times as a 'clearing house' for further advice, his province being not to give the non-optometric treatment but to direct the patient where he may obtain it." This statement can be taken as nothing else than claiming for the optometrist the ability and the right to diagnose the presence, if not the nature, of general systemic disease.

To deal with arrogance such as that shown by those who are evidently to be known as modern optometrists is a difficult matter. The holding of conventions and the publication of reports in the daily Press cannot fail to make an impression on the susceptible public mind. What is needed is a realization by the public that only medically trained persons are competent to discover disease processes. In the second place, the public must be taught that the eye is often the seat of disease or the mirror in which disease is reflected. The members of the community must be made fully aware of the risk they take when they entrust their eyesight to pretentious persons untrained in medicine. The several ophthalmic sections of the Branches of the British Medical Association in Australia might unite with the Ophthalmological Society of New South Wales in this matter. All ethical means of attracting the public attention should be used, and in such an effort the help of school medical officers should be sought; their opportunities for doing propaganda work among parents of school children are unusual. Finally, the interest of the general practitioner in ophthalmic conditions must be aroused (post-graduate committees might take note of this) and he should be ready to cooperate with his brother practitioner, the ophthalmic surgeon. Too often do general practitioners tell their patients to have their eyes tested without telling them to whom to go and without seeing that their advice is followed. Leaving other considerations, general practitioners owe it to their patients to see that they are sent to someone who is competent to give advice.

Current Comment.

PEPTIC ULCER.

RECENTLY some interesting and perhaps valuable experimental work has been carried out on the ætiology of gastric and duodenal ulceration by Warren B. Matthews and Lester R. Dragstedt, of the Department of Surgery of the University of Chicago.[1] These investigators point out that Dragstedt and Vaughn, in 1924, cut windows in the stomachs of dogs and sutured in each a piece of duodenum, jejunum, colon, spleen or kidney, with the object of observing the effect of gastric juice on substances other than gastric mucosa. In no instance were the transplanted tissues digested; the mucosa of the intestinal transplants remained normal for months, and the exposed surfaces of kidney and spleen were rapidly covered with gastric mucous membrane. From this it is clear that the various tissues of the body are powerfully resistant to the digestive activity of the gastric contents. But are they equally resistant to the action of pure gastric juice? Matthews and Dragstedt draw attention to the fact that the gastric juice is constantly being diluted and its acidity neutralized by food, saliva, mucus, regurgitated alkaline juices from the duodenum *et cetera*. They ask: "Does a defect in this neutralizing mechanism or any part of it account for the fact that a majority of patients with duodenal or gastric ulcer have a gastric content of higher than normal acidity and one which approaches the acidity of pure juice?" They point to the occurrence of Meckel's diverticulum ulcer as striking proof of the view that the chemical action of gastric juice may produce ulceration. It has been shown that when the ileal mucous membrane adjacent to a Meckel's diverticulum is ulcerated, islands of mucosa identical with that of the fundus of the stomach can almost invariably be found within the diverticulum. The suggestion is that neutralization of the juices produced by these heterotopic islands of tissue is inadequate. Matthews and Dragstedt reproduced a lesion similar to Meckel's diverticulum ulcer by anastomosing a Pavlov's accessory stomach pouch with the lower part of the ileum of the dog. Of nineteen animals operated upon, seventeen developed chronic ulcers of the ileum; in most cases there was a narrow area of healthy mucosa between the ulcer and the gastric tissue; the latter was never involved in ulceration. The significance of this experiment, of

[1] *Surgery, Gynecology and Obstetrics*, September, 1932.

course, is in the fact that undiluted gastric juice flowed from the Pavlov pouch.

In another series of experiments Matthews and Dragstedt isolated the stomach from the remainder of the intestinal tract, leaving the vagus innervation intact; an external fistula was formed by means of a metal cannula, which could be opened or closed as required. Under these conditions the stomach contained undiluted gastric juice for long periods. In one case severe ulceration of the gastric mucosa developed. The possibility of trauma by the cannula, of course, could not be excluded.

In the next series of experiments a Pavlov pouch, consisting of two-thirds or three-quarters of the fundus was connected to the external body surface by a fistula in such a way that the contents did not drain away freely. By this operation a mere channel of stomach tissue remained connecting the œsophagus and duodenum. It was found that the percentage of free acid in the secretion of such a large pouch was many times greater than in the secretion of small pouches. In one instance a large ulcer formed in the pouch and perforated into the general abdominal cavity. It is significant that the gastric channel, subjected as it was to peristalsis and trauma by coarse food, remained healthy.

Stimulation of gastric secretion by sham feeding was carried out, either after the production of an œsophageal fistula or after anastomosis between the œsophagus and the jejunum. Ulcer did not develop in the course of any of the few experiments.

In order to test the value of the bile and the duodenal and pancreatic secretions as agents concerned in the prevention of peptic ulceration, Matthews and Dragstedt operated on a number of dogs, separating the duodenum from the stomach and jejunum and anastomosing its lower end with the lower part of the ileum and uniting the upper end of the jejunum with the pylorus. Ulcer of the jejunum developed near the gastro-jejunal junction; but it was noted that the pylorus became greatly thickened and the lumen narrowed; it was thought that the squirting of gastric contents on to a small area of jejunal mucosa might have been a mechanical factor in the causation of ulcer. The investigators repeated the experiment, resecting the pylorus and making a wide anastomosis, thus eliminating the "jet" action. All of the five dogs operated upon developed ulcer of the jejunum. It is pointed out that factors other than undiluted gastric contents may have had an influence in these cases, for the animals suffered from diarrhœa and loss of appetite, and rapidly became cachectic. If the duodenum is anastomosed with the middle or upper part of the jejunum instead of the ileum, cachexia does not occur, but neither does ulceration. This has been attributed to regurgitation of the duodenal secretions along the jejunum to the region of the gastro-jejunostomy opening. In order to test the validity of this theory, Matthews and Dragstedt separated the duodenum from the stomach and jejunum, united the jejunum and stomach by end-to-end anastomosis and implanted the lower end of the duodenum in the jejunum at a point 40 centimetres from the gastro-jejunal anastomosis; after a period varying from 80 to 300 days a second operation was performed. Ulcer of the jejunum was found in only one of twenty-one dogs employed in the experiments. At the second operation an ingeniously contrived valve was fixed in the jejunum with the object of preventing regurgitation of duodenal secretion. Ulcer of the jejunum developed in six of the ten animals that retained the valves. The influence of trauma in these cases could be practically ruled out, as the ulcer occurred close to the anastomosis.

Matthews and Dragstedt made a permanent pancreatic fistula by isolating the upper part of the duodenum and allowing it to drain through a cannula passed through the parietes; the common bile duct was anastomosed with the stomach, and gastro-duodenostomy was performed. Ulcer of the duodenum developed in every instance. This ulceration could be prevented by giving alkalis.

In a final series of experiments a valve was inserted into the pylorus, preventing any possible regurgitation of the duodenal contents into the stomach. It was found that the free and total acid was increased, the healing of acute gastric ulcers produced by the injection of silver nitrate solution was delayed, and in 50% of experiments portions of intestine transplanted into the stomach became ulcerated.

Matthews and Dragstedt believe that the results of their experiments lend considerable support to the view that the chemical action of gastric juice alone may suffice to cause ulceration. They remark that of the three main factors possibly concerned in the production and maintenance of ulceration (gastric motility, trauma by food "roughage", and chemical action), the chemical action of the gastric juice seems to be the most important. They admit that their investigations do not reveal any information concerning the influence of food "roughage" and gastric motility on the healing of peptic ulcers.

The work carried out by Matthews and Dragstedt is an important contribution to the study of gastric and duodenal ulcer. The stress laid on the neutralizing value of the duodenal contents is of particular interest, especially as there has been a tendency recently to scoff at the suggestion that bile may regurgitate into the stomach under normal conditions. Matthews and Dragstedt have done a service in putting together the records of such a vast amount of experimental work and in drawing attention to a probable ætiological factor that is apt to receive but cursory consideration nowadays. They have not solved the problem of the ætiology of gastric and duodenal ulceration; but they appear to have made a step forward in the solution of this problem. Of course, care must be exercised in the interpretation of the evidence they have produced; it must be remembered that all the experiments were performed on laboratory animals and that in many cases extensive surgical procedures were carried out, and that in some cases quite large foreign bodies were fixed in the lumen of the intestine.

Abstracts from Current Medical Literature.

PÆDIATRICS.

Abdominal Pain with Acute Upper Respiratory Infection.

S. A. COHEN (*Medical Journal and Record*, January, 1932) describes abdominal pain as part of the symptomatology of acute upper respiratory infection in infants and children. Periumbilical colic may be very severe and may occur even before the upper respiratory infection is evident. It is thought to be due to swelling of the mesenteric or retroperitoneal lymph glands from involvement by way of the blood stream. Occasionally the diagnosis from acute appendicitis is difficult. Although vomiting may occur, on account probably of the associated pain, the pains have no relation to food and are fortunately often fleeting. Locally, there is an absence of marked rigidity. It is well to bear in mind that a chronically inflamed appendix may be wakened into activity as a result of an upper respiratory infection.

Erythroblastosis of the New-Born.

S. H. CLIFFORD AND A. T. HERTIG (*New England Journal of Medicine*, July, 1932) apply the title erythroblastosis of the new-born to congenital *hydrops fœtalis* and *icterus gravis*, as the pathological picture of each condition is said to consist of a persistence of the embryonic level of blood formation with large numbers of circulating nucleated red cells formed in the liver, spleen, pancreas, kidneys, adrenal, thymus, pituitary and lymphatic glands, as well as in the bone marrow. They have made observations on seven cases, two of the congenital hydrops type and five of *icterus gravis*, an incidence rate of one per 1,200 births for the former and one per 340 births for the latter. The major part of the disease occurs during the intrauterine period. There is evidence of a varying amount of blood destruction, and if this exceeds the increased production, profound anæmia of the congenital hydrops type ensues. The heart becomes greatly hypertrophied, as in adult polycythæmia, and the anasarca, when present, may be the result of cardiac defect. The diagnosis is suggested at birth by the presence of a thick, golden-yellow *vernix caseosa*. The placenta may be hypertrophied, and physical examination may reveal anæmia, œdema, jaundice, dusky cyanosis, petechiæ and enlargement of the liver, spleen and heart. Treatment consists in transfusion with whole blood at the earliest possible moment, and in the forcing of fluids.

Anæmia of Prematurity.

A. F. ABT AND B. R. NAGEL (*The Journal of the American Medical Association*, July 25, 1932) have attempted to allay the onset of anæmia in premature infants by hæmatinics. They find that iron therapy alone is of doubtful value and also liver or stomach extracts alone. They have obtained favourable results by the use of a dried liver fraction, combined with ferrous ammonium citrate, in premature infants of six or seven months' gestation in which the development of the anæmia was most severe. No light was thrown by their work on the causative factor, but they suggest an inadequate iron reserve depôt or its early depletion or a functional insufficiency of an imperfectly developed hæmatopoietic system, similar to the imperfectly developed alimentary, cardio-vascular and heat-regulating systems of the premature infant. The treatment is started within the first fourteen days of birth with initial dosages of one to two grammes twice a day, increased to four grammes twice a day.

Lesions of the Pharynx in Acute Rheumatism.

A. D. FRASER (*Archives of Disease in Childhood*, August, 1932) has examined the pharyngeal tissues and cervical lymph glands of four patients who died of uncomplicated rheumatic fever. Some of these lesions are in close relationship to the tonsillar capsule, but others are frequently as far removed as the œsophageal opening. The lesions were of all degrees of development, some fibrous, others recent. They are usually to be found near the pharyngeal, lingual and laryngeal tonsil, while the associated cervical lymph glands show specific rheumatic lesions (Aschoff bodies) or marked proliferation of the endothelial cells of the sinuses, blood vessels and reticulum, accompanied by much plasma and polynuclear cell infiltration of the plasma. The author suggests that these lesions provide a specific histological basis for the sore throat so frequently associated with rheumatic infection, but in three of the four cases there was no clinical evidence pointing to its presence. The tonsils are the port of entry for the organisms causing these lesions, and apparently the organisms readily break through the tonsillar capsule.

Dwarfism and Calcinosis.

REGINALD LIGHTWOOD (*Archives of Disease in Childhood*, August, 1932) reports the instance of a female child of two years and three months, who presented dwarfism and calcinosis. He reviews the literature of calcinosis and extreme arterial degeneration in childhood; this includes one other British account by Bryant and Hale White of a similar condition, but in their patient in association with congenital dilatation of the ureters. The author excludes any possibility of cause and effect in this instance, as present reviews of distended ureters in childhood contain no such association. He compares the condition to hypervitaminosis, but his patient had not received any irradiated ergosterol. On examination, she was very small, her weight for age had never been correct and she had a good family history. She had a biscuit-coloured skin, no detectable enlargement of the heart, systolic blood pressure of 180 millimetres of mercury and hard tortuous radial arteries; albuminuria was present; there was a blood urea of 169 milligrammes *per centum*, serum calcium 11 milligrammes *per centum* and serum phosphorus 6·68. At *post mortem* examination the skull vault was found to be thickened with osteosclerosis of the base and maxillæ, calcification of the endocardium was present, and thick and tortuous coronary arteries. The calcification had occurred in massive form in the media of most medium sized and small arteries, which were visible in skiagrams, and these changes were least marked in the circle of Willis and in the renal arteries, though the renal parenchyma showed a remarkable degree of interstitial fibrosis. Calcification had occurred to a mild degree in certain glomeruli, and unmistakable calcium casts were seen. The parathyreoid glands were dissected out and found to be normal. Histological examination of the bones revealed in effect that though excessive calcium and phosphorus deposits were seen, yet there was insufficient calcification of growing cartilage. The author explains this as being due to a phasic disturbance in the calcium-phosphorus ratio, having no relationship to vitamin *D*, parathormone or renal influences.

Stenosis of the Colon in Infancy.

ANNE E. SOMERFORD (*The Lancet*, September 17, 1932) reports four cases of stenosis of the colon in infancy with *post mortem* findings. The stenosis consisted in each instance of a fibrous stricture with a certain amount of increase in the circular muscle tissue. She discusses the following ætiological possibilities: embryonic disturbances of development, that is, a persistence of the solid cellular gut; mechanical causes, mostly operative, by pressure from without, such as abdominal tumours; enlarged head of the pancreas *et cetera*; fœtal peritonitis. She draws attention to the extraordinary fact that nearly all the babies affected have been males, which applies equally to congenital pyloric stenosis. A search of the literature reveals two main pathological types of atresia, one purely muscular and one of purely inflammatory origin. The condition needs clinical differentiation from Hirschsprung's disease and from congenital pyloric stenosis.

A Ward Outbreak of Erythema Nodosum.

NORMAN D. BEGG (*The British Journal of Children's Diseases*, September, 1932) discusses the traditional views as to the ætiology of *erythema nodosum*, pointing out that the absence of rheumatic nodules and endocarditis has weighed heavily against the rheumatic hypothesis. As regards infectious origin, Lendon, of

Adelaide, is quoted as the originator of the specific infectious theory, calling the disease "nodal fever". The association in epidemic form with tuberculosis is explained as due to spread from an unsuspected case of open infection. The author describes an epidemic affecting four of twelve children convalescing in the same ward from pertussis. All were under six years of age. All had been exposed to infection from a thirteenth child who had died from miliary tuberculosis a week before the first case of erythema appeared. The skiagrams of the mediastinum of the affected children suggested some degree of glandular enlargement, but more striking was the result of the Mantoux test, to which all the patients reacted strongly. No direct evidence to incriminate a hæmolytic streptococcus (Collins) was produced as a result of the Dick test or from the taking of throat swabs. No new patients admitted to the ward after the death of the child from miliary tuberculosis developed a rash.

ORTHOPÆDIC SURGERY.

Thrombo-Angiitis Obliterans.

A. W. ADSON AND G. E. BROWN (*The Journal of the American Medical Association*, August 13, 1932) contend that in their original experience the results of sympathectomy were not so good as they are at the present time, because previously they were attempting to operate on patients who did not have sufficient vasospasm or sufficient vessels that could go into spasm and that called for relief. Now their patients are admitted to hospital, given vaccine and a regional or spinal anæsthetic to determine the degree of vasospasm, and unless the authors are able to record an increase in skin temperature over the digits twice as great as that obtained by the mouth temperature during the height of fever, they do not operate. When either spinal or regional anæsthesia is used the same vasodilatation effects are accomplished, and sympathectomy is not employed unless the peripheral skin temperature is raised 3° C. They frequently administer from one to three injections of typhoid vaccine to determine whether the patient is relieved by vasodilatation. If the index is favourable and the patient relieved, they perform sympathectomy. They have performed chordotomy in two instances with only moderate success. Occasionally pain is unrelieved owing to interstitial changes occurring above the local ulcer.

Fractures of the Wrist.

R. K. GHORMLEY AND R. MROZ (*Surgery, Gynecology and Obstetrics*, September, 1932) have tabulated the results of treatment of a group of recent fractures about the wrist and have compared them with similar results following the treatment of old fracture. They found a higher percentage of poor results in the similar types of fracture probably because the tendency is to treat them without reduction under anæsthesia. They emphasize the importance of accurate reduction of displacements, together with early active movements. Of the operative procedures in the treatment of old fractures about the wrist they found osteotomy of the lateral end of the ulna, capsulotomy of fingers for stiffness, and excision of the proximal fragments in fracture of the navicular to give good results.

Congenital Elevation of Scapula and Paralysis of Serratus Magnus Muscle.

A. WHITMAN (*The Journal of the American Medical Association*, October 15, 1932) discusses the treatment of paralysis of the *serratus magnus* and congenital elevation of the scapula and describes the results in several patients. The procedures formerly in use for the treatment of this condition consisted in subperiosteal dissection of the scapula, drawing it downward and fastening it to the lowest possible rib with chromicized catgut or silver wire. The boring procedure which he has devised he considers to be an improvement. The superior and vertebral borders of the scapula are exposed and four holes are bored through it with a drill, one at the superior angle, one at the junction of the spine and vertebral border, one in the middle of the vertebral border, and one at the inferior border. The spinal processes of the fourth, fifth, sixth and seventh dorsal vertebræ are then subperiosteally exposed as for a spinal fusion, and are pierced with a drill. Four strips of fascia, twenty centimetres (eight inches) long by six millimetres (one-quarter of an inch) wide, which have been removed from the thigh, are passed through the corresponding holes in the scapula and spinal processes and tied under tension. The muscles are sewn in place, the subcutaneous tissue is closed with plain gut and the skin with silk. The arm is held abducted 45° beyond the right angle for three weeks, after which active movement is instituted.

Treatment of Congenital Club Feet.

J. H. KITE (*The Journal of the American Medical Association*, October 1, 1932) discusses the relative value of operation and non-operative lines of treatment for congenital club feet. He has studied the results in 149 patients in the non-operative group and has concluded that the duration of treatment was not materially shortened by beginning treatment at an early age, but that such early treatment gave better subsequent functional results. The duration of treatment becomes progressively longer after the child begins to walk. Children with other congenital deformities require on the average thirteen weeks longer for the correction of the deformity. The non-operative treatment in question consisted in the use of casts and wedges without the use of anæsthesia or force. These patients showed better functional results and also better anatomical results with less stiffness and less loss of elasticity in the foot than the operative groups.

Thyreoid Disease and Chronic Non-Specific Arthritis.

W. S. DUNCAN (*The Journal of the American Medical Association*, October 8, 1932) again draws attention to the systemic nature of chronic arthritis. He holds that every possible factor must be investigated. By far the greater number of cases of chronic non-specific arthritis are not attributable to thyreoid dysfunction. Aggravation of a preexisting arthritis is particularly noticeable in hyperthyreoidism. Some of these may be coincidences, but in others there is complete relief of severe and intractable pain in the joints after thyreoidectomy for the hyperthyreoidism. Neumann and Lande are quoted as concluding that the patients with primary chronic arthritis appearing at the climacteric and with increase of weight are the subjects of some disturbance of the endocrine apparatus with resultant hypersensibility of the sympathetic system. This produces local spasm of vessels about joints with resultant nutritional changes in the joints. He considers that the test of treatment and clinical judgement are of greater value than basal metabolic rate estimations and gives the following as essential criteria for the diagnosis of hypothyreoidism: Dryness of hair and skin, atrophy of nails, numbness and tingling, œdema, increasing drowsiness, diminished energy, failing memory, coldness. Gain of weight is not an essential sign. He suggests that the periarticular changes are either the result of trophic disturbances initiated by the hyperactive thyreoid gland through the vegetative nervous system or of sensitization of the individual to infection by the same agency. Hyperthyreoidism is accompanied by periarticular changes, leading to atrophy. These changes are amenable to thyreoidectomy. The articular manifestations of hypothyreoidism are degenerative, slowly progressive and readily relieved by thyreoid extract in adequate dosage.

Infantile Rickets.

M. M. ELIOT *et alii* (*The Journal of the American Medical Association*, September 24, 1932) compare the value of salmon oil with that of cod liver oil and "Viosterol" (irradiated ergosterol). The salmon oil is cheaper and some specimens are known to contain vitamin *A* as well as vitamin *D*. They found that salmon oil compares very favourably with "Viosterol" in its rapidity of action and is more potent than cod liver oil. It brings about fresh calcification in the rhachitic metastasis demonstrable in radiograms taken at the end of one week of treatment, it raises blood calcium and phosphorus a significant amount in the same time and to normal in two to three weeks. Calcification of the metaphysis was normal in three to five weeks in cases of moderate rickets.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at Bendigo Base Hospital, Bendigo, on September 17, 1932. The first part of this report was published in the issue of December 3, 1932.

Infected Leg with Muscular Sloughing.

DR. M. JACOBS showed a blacksmith, aged sixty-nine years, who had knocked his leg against a stool and rubbed the skin off. He knocked it again a few days later. The leg started to swell on the instep. A spark from a welding iron fell on the instep and burnt it. The foot started to swell on the inner side; a few days later the whole leg started to swell.

The patient was told to come to hospital, but would not do so. He treated it with a liniment for two weeks; he also used pawpaw ointment. He came into hospital after twenty-five days of infection. He had never been ill before.

On the patient's admission to hospital there was a cellulitis over the lateral portion of the right leg; no spreading edge was present. The leg was very hot and slight fluctuation was present to the lateral side of the tibial crest.

An incision was made under general anæsthesia and pus was expressed. The bone which was exposed was apparently not affected. No foreign body was seen. The leg was treated with eusol compresses and iodine. Later on hypertonic saline foments were used. Hæmorrhage occurred the next evening. No bleeding points were seen; there was a steady oozing from fat tissue. Normal horse serum was given.

An ulcer started to develop three to four weeks after hæmorrhage; it spread over the whole of the antero-lateral aspect of the leg. The muscles in the anterior compartment were swollen and gangrenous. There was no evidence of gas gangrene. There was a purulent and offensive blood-stained discharge. Carrel-Dakin treatment was given. Later iodoform paste was applied to the wound; the slough was separating. Most of the muscles of the calf had sloughed out, leaving a large cavity lined by granulation tissue. The tibia and fibula were almost entirely covered by granulation tissue. Circulation in the lower part of the leg was poor. The Wassermann test gave no reaction.

DR. VICTOR HURLEY and DR. A. E. COATES both recommended supracondylar amputation, as the extensive necrosis of both bones of the leg and sloughing of the muscles had rendered the patient's ankle joint and lower leg quite useless.

X Ray Appearances in Mitral Stenosis, Silicosis and Pulmonary Tuberculosis.

Three patients were shown by DR. K. G. KERR and illustrated the X ray appearances of the lungs in mitral stenosis, silicosis and pulmonary tuberculosis.

A male patient, aged twenty years, was first seen two years ago, complaining of cough for six months, with expectoration, occasionally blood-stained, night sweats, loss of weight and strength, shortness of breath, and pain over the sternum. He had pneumonia three years previously and a history of chorea, he had not been a miner, but his father had died of miner's phthisis five years previously. Physical examination revealed impaired percussion note and prolongation of expiration over the upper lobe of the right lung posteriorly, with some impairment and moist sounds at both bases. The heart was enlarged and a mitral lesion was detected. Sputum examination revealed no tubercle bacilli.

X ray report was as follows: "Extensive linear fibrosis and mottling radiating from the hila. No general clouding, cavity formation or fluid collection. Appearance strongly suggestive of hilar type of pulmonary tuberculosis."

The patient was admitted to Amherst Sanatorium and remained there for three months, gaining four kilograms (nine pounds) in weight. The temperature record was generally normal, but occasionally there were rises of temperature to 37·2° C. (99° F.) and over. The pulse rate was over 90 on occasions. He speedily lost 2·2 kilograms (five pounds) in weight after returning home. Twelve months later he was admitted to the Bendigo Base Hospital after a hæmoptysis, said to be "more than two cupfuls". He had felt well during the previous three months, with no cough, but with left-sided thoracic pain and night sweats. Three months later he was again admitted after a smaller hæmoptysis. He was now complaining of intermittent swelling and tenderness in the epigastric region, most marked with exertion, and constant cough. A radiograph of the chest showed much the same appearance as previously, and sputum examination again revealed no tubercle bacilli, the weight being as before. The apex beat was in the fifth interspace, 8·75 centimetres (three and a half inches) from the mid-line. There was no right cardiac dulness. At the apex beat was heard a presystolic and a systolic murmur and a reduplicated second sound. In one instance he was admitted to hospital after a hæmatemesis. Later, while still in bed, he was given a diagnostic series of tuberculin injections subcutaneously in an attempt definitely to exclude pulmonary tuberculosis from the diagnosis, but after the second injection, of 0·001 cubic centimetre of old tuberculin, he had a local and general reaction with temperature 37·8° C. (100° F.) and a hæmoptysis. He now complained of cough with expectoration and palpitation, but was otherwise well. In the sputum no acid-fast bacilli were found. Withdrawal of one cubic centimetre of blood from a vein at the elbow for a blood sedimentation test recently precipitated, on releasing the tourniquet, an immediate hæmoptysis. The sedimentation index was ten millimetres in one hour.

DR. M. D. SILBERBERG said that it was necessary to be cautious in diagnosing pulmonary tuberculosis when there were already congestive conditions of the lung in heart disease. The latter could easily be mistaken radiologically for tuberculosis. The X ray appearances in Dr. Kerr's patient were, in his opinion, not conclusive, and the positive old tuberculin reaction would not necessarily prove that the pulmonary condition was tuberculous.

DR. J. P. MAJOR agreed with Dr. Silberberg that the association of mitral stenosis with tuberculosis of the lungs was very rare.

In reply, Dr. Kerr said that the patient had been presented, not as suffering from a combination of mitral stenosis with pulmonary tuberculosis, but as one whose early symptoms had suggested pulmonary tuberculosis, whose hæmoptyses had proved to be due to mitral stenosis, a subsequent investigation having failed to exclude tuberculous infection.

A male patient, aged forty-two years, seventeen years ago, at the age of twenty-five, after an attack of measles, developed a cough with occasional blood-stained sputum. Examination of the sputum revealed tubercle bacilli, and he rested for six months. For eight years he kept well, but had an occasional hæmoptysis, and in 1929, after one of one pint, entered a sanatorium, where he remained for nine weeks. In January, 1931, X ray examination at Bendigo Base Hospital revealed "coarse, dense mottling of the whole of the right lung with a cavity near the centre. The left lung showing scattered, coarse, fleecy mottling pathognomonic of an advanced pulmonary tuberculosis and a small amount of fluid at the right base". He was examined by X rays again in April of this year, and the area of mottling in the right lung was shown to be smaller and more clearly defined, suggesting a fibrosing process He was under treatment for right frontal sinusitis and complained of symptoms suggesting duodenal ulceration. A blood sedimentation test gave an index of 9·5 millimetres in one hour, and the temperature chart showed little deviation from normal. On these findings, and because of the suggestion of a tendency to fibrosis in the lungs, it was considered that a course of tuberculin might benefit him, in spite of the fact that there was present such an advanced condition. He was given "Commonwealth" old tuberculin and began with a dose of 0·000001 cubic centimetre four months ago. The dosage had been carefully regulated and gradually increased, only slight local reactions resulting. At the time of the meeting he

was up to 0·002 cubic centimetre and the dose was being increased. Except for two slight colds and a bout of melæna for a few days, his chart showed no rises in temperature over this period. He stated that he had been decidedly better this winter than last. The weight was stationary, and the last two sputum examinations failed to reveal tubercle bacilli. The X ray report received the day before the meeting was:

> Film shows a continuation of the fibrosing process, so that the three films are a series showing gradual fibrosis, as indicated by the narrowing of the lines of inflammatory reaction and a more clearly defined, clear-cut edge, with, in many instances, a complete clearing up of small previously mottled areas.

Dr. Kerr said that the case illustrated the use of tuberculin in addition to adoption of a hygienic life when conditions were pointing to inactivity of the infection and when there was an inherent tendency towards fibrosis in the lungs, even when extensive disease was present.

A male patient, aged fifty-four years. For fourteen years, 1916 to 1930, he was employed in sand blasting on moulds and baths. He had had no mining experience. During these years he developed cough and expectoration. He wore no mask at work and took no precautions against inhalation of dust. Cough had been troublesome during the last two years, with post-tussic vomiting. There had been loss of weight and strength recently, and dyspnœa. He had had no other illnesses and there was no family history of tuberculosis. On examination he showed poor expansion, dulness to percussion over the right upper lobe anteriorly and posteriorly, with bronchial breathing in this area posteriorly. There was a soft systolic murmur heard all over the heart and an accentuated pulmonary second sound. At the left base could be heard occasional crepitations. X ray examination revealed coarse fleecy mottling of the whole of both lungs, the appearance being considered pathognomonic of generalized advanced pulmonary tuberculosis. Sputum examinations, two in number, revealed no tubercle bacilli, and the maximum temperature was 36·9° C. (98·4° F.), with a constantly inverted type of chart, the temperature being usually 36·9° C. (98·4° F.) in the morning and 36·1° C. (97° F.) in the evening.

Dr. Kerr raised the question whether the condition was tuberculosis alone or advanced pneumonokoniosis following on his previous occupation, the latter with or without a superadded tuberculous infection.

Medical Societies.

BALLARAT CLINICAL SOCIETY.

THE ANNUAL MEETING OF THE BALLARAT CLINICAL SOCIETY was held at the Ballarat Hospital, Ballarat, on June 21, 1932, DR. J. C. DOUGLAS, the President, in the chair.

Election of Office-Bearers.

DR. J. C. DOUGLAS, the retiring President, reviewed the work of the past year and congratulated the members on the clinical cases brought forward.

DR. ERNEST GUYMER was elected President for the ensuing year and thanked the members for the honour.

DR. CHARLES RICHARDSON was reelected Honorary Secretary and was thanked for his services during the past year.

Interstitial Keratitis.

DR. J. C. DOUGLAS showed two patients who were suffering from interstitial keratitis which had improved rapidly under antisyphilitic treatment. One patient gave a strong positive and the other failed to react to the Wassermann test. Treatment had consisted of fortnightly intramuscular injections of "Metarsenobillon", commencing with 0·3 gramme. "Bismol", 0·5 to 1·0 cubic centimetre, was injected in the alternate weeks. *Mistura hydrargyri biniodidi* was given by mouth. Vision had improved in four weeks from $^{6}/_{60}$ to $^{6}/_{12}$, and the eyes were white and quiet.

Fibrosarcoma of the Thigh.

DR. J. M. GARDINER asked for an opinion on a case of fibrosarcoma of low malignancy, situated in the muscles of the lower inner region of the thigh. The condition had apparently been cured by radium, both bomb and needles being used. Being told that he could do anything he liked, the patient had taken a ten-mile walk. Very soon afterwards the swelling had returned. The question was whether the swelling was a hæmatoma, or a thrombosis, or a malignant recurrence. The consensus of opinion was that it was a true recurrence and amputation at the hip joint was advised.

Addison's Disease.

DR. G. T. JAMES showed a case of early Addison's disease which had been classified as malingering by the railway department.

Plastic Peritonitis.

Dr. James also presented a case of a young woman with chronic plastic peritonitis and diarrhœa. Dr. W. W. Chaplin demonstrated the X ray films, which showed sagging of the transverse colon from adhesions, with delayed passage of a barium meal. The question of diagnosis was discussed and opinions differed as to whether it were tuberculous, gonococcal, or due to an old appendicitis. A tuberculin test was advised, and if the result proved "negative", it was thought that laparotomy should be performed.

Tuberculous Cystic Kidney.

DR. R. DAVIDSON demonstrated a specimen and slides from a nephrectomy which he had performed for tuberculous cystic kidney, and spoke on the pathology and treatment. The slides were beautifully demonstrated with the new binocular microscope recently presented to the hospital.

Hydrocephalus.

DR. W. R. GRIFFITHS showed a specimen of hydrocephalic fœtus which he had diagnosed in advance by means of an X ray photograph, and the film was shown. The patient had gone past her due date without coming into labour. Treatment had been by craniotomy, followed by version and bringing down a foot. The patient became very ill and delivery was rapid and easy. Recovery was uneventful.

Obituary.

GEORGE REDFEARN HAMILTON.

DR. GEORGE REDFEARN HAMILTON, whose tragic death as a result of an aeroplane accident was recorded recently in these pages, was born on January 13, 1893. He was the son of the late Hugh Montgomerie Hamilton, sometime District Court Judge in New South Wales. Commencing his education at the Sydney Church of England Grammar School, Hamilton at once showed a proficiency at sport and an ability to study which characterized him throughout his all too short life. He was a prefect at school and Head of his House; he was also captain of the football team; a member of the school crew; a member of the first athletic team, representing his school at the All Schools Sports; a member of the second cricket eleven and of the rifle team. He won the Pockley Prize for general proficiency in sport and work in 1911.

In 1912 Hamilton became an undergraduate in medicine at the University of Sydney, going into residence at Saint Paul's College. When war broke out in August, 1914, he tried to enlist, but was rejected on account of a broken jaw sustained on the football field. He tried to enlist again later on, but an embargo had then been placed

on the enlistment of medical students. The curriculum at the University of Sydney was shortened during the war years, and Hamilton was one of those who graduated in 1916 under this provision. During his undergraduate career he represented his university at football, shooting and rowing.

After graduation "with credit", Hamilton spent a month or two at Warwick Hospital, Queensland, and then went into camp. He left Australia as captain in the Australian Army Medical Corps. He was medical officer in turn at base hospitals, general hospitals, casualty clearing stations, and a field ambulance. He was attached to the Fourth Battalion and was wounded at Proyart, France. Subsequently he was attached to the Australian Dermatological Hospital at Bulford.

After the war Hamilton took up the study of skin diseases. He served under Dr. Sequeira at the London Hospital and was also Clinical Assistant at the West London Hospital. After his return to Australia he devoted his time entirely to dermatology and held several appointments, being Honorary Assistant Dermatologist at the Sydney Hospital, Honorary Dermatologist at the Royal North Shore Hospital of Sydney, Honorary Dermatologist at the Royal South Sydney Hospital, and Honorary Consulting Dermatologist at the Masonic Hospital, Sydney.

Hamilton took his part in the corporate life of his profession. As a member of the New South Wales Branch of the British Medical Association he could be counted on when subjects connected with his specialty were under discussion. He acted as Secretary to the Section of Dermatology of the Third Session of the Australasian Medical Congress (British Medical Association) of 1929. He also maintained his interest in the Dermatological Section of the Royal Society of Medicine, London, and of the British Association of Dermatology. He was a member of the Treatment Advisory Subcommittee of the Cancer Research Committee of the University of Sydney and he represented the Commonwealth of Australia at the Public Health Conference at Brussels in 1920. He contributed several articles to this journal and was always ready to review books on dermatology for its pages.

Apart from his activities as a member of the medical profession, Hamilton was best known as a flier. His journey with his friend Holden in the *Canberra* in search of the crew of the *Southern Cross* will remain an epic in the history of Australian flying. Those who heard him lecture on the experiences of the journey will not readily forget the charm with which he told the story nor the complete effacement of himself in the telling. Hamilton was interested in many things. He was a member of the Council of the Royal Agricultural Society of New South Wales, a member of the Rotary Club, a member and sometime President of the Microscopical Society of New South Wales, a Fellow of the Royal Geographical Society, a member of the New South Wales Aero Club; he sat for some years on the Council of the Rugby Union, and played ice hockey for New South Wales against Victoria. He had a direct manner, but was charming withal; he was always full of fun, and his keen sense of humour was a delight to those with whom he came into contact. His place will not easily be filled.

Dr. M. C. Lidwill writes:

Those who were the friends of George Hamilton and knew him thoroughly well, will realize what a loss his death was to the community and to themselves. I first knew George Hamilton as a student and took a great liking to him. Inside his rather wild and robust exterior lay a heart of gold, and a gentleman. I have lived with George Hamilton at times for weeks on end; I never saw him lose his temper or do an unkindly act. The more one saw of him, the more one liked him. He had the courage and strength of a lion.

He was a man of varied interests, always scientifically minded. His hobbies consisted mainly of scientific subjects. He was President of the Microscopical Society for quite a number of years, and an excellent president he was, always battling for the improvement of the Association. He was a very keen photographer, in fact, one of the best amateurs in New South Wales. Also, he had been a first class Rugby player and ice hockey player, and was always keenly interested in these two sports, but owing to his war injuries he was handicapped from joining in as much as he would have liked.

His most intimate friend was poor Les. Holden, a gentleman like himself. George Hamilton acted as navigator when Sir Kingsford Smith's party were lost in Northern Australia. This flight has never been recognized sufficiently. It is probably one of the greatest flights ever made in the world. They had only thirty-six hours to prepare for it. I believe something like 9,000 miles of this journey was over unexplored country. When other great flights have been undertaken, preparation has been made for weeks and months beforehand, yet Les. Holden, George Hamilton and crew started off just as if they were going to fly over a well known route, and never considered the danger for one moment. Unfortunately, this flight was never brought before the Royal Humane Society, for if ever a crew deserved recognition by this body, these people did. George Hamilton's navigation was so good that he was able to locate the position of the stranded aviators within a mile or two, so that they could be rescued by a smaller plane afterwards. To show what class of country they were flying over, George told me that he saw twenty-eight rivers that were not even marked on the map.

When George returned it was not this heroic deed that was dominant in his mind, but only the funny incidents that had occurred at various places, such as Wyndham. It may be interesting for the public to know that this flight cost George Hamilton over £200 out of his own pocket, as he gave the cinematograph films of the journey to the Citizens' Fund.

For his exploring work in Australia George Hamilton was made a Fellow of the Royal Geographical Society. His spare afternoons and spare time were largely taken up in flying.

The loss of George Hamilton has made such a gap in the lives of his friends that they never expect to fill it.

Dr. A. J. Gibson writes:

I have been asked to write a few words about Dr. George Hamilton, whose friendship I had been privileged to enjoy for several years.

I first became acquainted with Geordie, as he was affectionately known to his friends, in 1913, when he was a medical student doing anatomy and I was Demonstrator in Anatomy, and the friendship started then continued and increased for the remainder of his life. "There was something about you which appealed to me from the first time I met you", Hamilton told me in after years, and I found in him a fascinating companion and a staunch and loyal friend.

Hamilton crammed a great deal into a comparatively short life. His interests were varied and his accomplishments many and great. It is not my intention to write at length of his activities in the realm of sport, in which he played a prominent part as a schoolboy and as an undergraduate, but some of my most pleasant memories linger round the friendly though stern tennis contests which we enjoyed on many occasions at the home of Dr. John Hoets. At photography Hamilton excelled; most of his results were outstanding from an artistic and technical point of view. His professional work was of the highest standard, and his keenness and enthusiasm boundless. It never mattered to him whether the patient was rich or poor; he gave of his best to all, cheerfully and willingly.

Possibly the exploit by which he will always be remembered will be his association with Captain Holden and his companions in the historic flight of the *Canberra*, when the *Southern Cross* and its gallant crew were found and rescued. At the request of Captain Holden, he went at a moment's notice on a desperate adventure. A few days after his return I went to his home, and there, with a map before him, in a simple and unostentatious manner, he outlined the story of the flight as if it had been the most ordinary everyday affair. It has always seemed to me that this tremendous achievement has never received the honour it deserved. When one recalls that with only a day or two to prepare, and with faulty and inadequate maps as a guide, the *Canberra* flew a distance almost

equal to a flight to England, over mostly unknown country, where a mishap meant disaster or death, one stands amazed at the achievement. It was in very truth an epic flight, the complete written record of which should be preserved for future Australians to know of and to glory in. But when all is said and done, Hamilton will be remembered by his friends for his own individual personality. He was a born *raconteur*; when once we started to yarn, time would fly so quickly that it was often the small hours of the morning before one realized that the next day's work had to be done and a little sleep was advisable. His ending was what one would expect of such a man. One could scarcely picture George Hamilton growing old and suffering a lingering illness. He was so strong and apparently so tireless that he never seemed to realize that others less endowed might feel wearied by late hours and efforts which caused him no fatigue. He and his best friend, Leslie Holden, passed on together in a way they possibly might have chosen, but those who are left, his wife, children, sister and brother and friends, will miss him in a manner mere words cannot tell. One can hardly realize yet that he is gone from us and that his memory alone remains.

Correspondence.

THE PRICE OF ETHER.

SIR: In reply to the letter of "Standard" in your number of November 26, 1932, we beg to contradict absolutely his statement that anæsthetic ether made in Australia by our company is inferior to the imported product, and in proof enclose you a copy of a report on our anæsthetic ethers made by the leading British authority on anæsthetics, which you are at liberty to show to "Standard" and any other interested party.

If he desires, we will post him a copy of the report, or he may read the original at this address.

The report proves definitely that there is no difference between the anæsthetic properties of our ether and German ether.

We are also willing to supply samples of our anæsthetic ether to any reputable authority whom he may suggest, to be submitted to tests, chemical or medical, to prove that our ether is quite equal in all respects to any imported ether.

Our anæsthetic ether has been used by all the leading hospitals and medical practitioners throughout Australia for the past eighteen years; it is made under the strictest scientific supervision, and before being dispatched from our works is submitted to the most rigid tests for purity.

These tests prove that it is quite equal in quality to any imported ether.

Yours, etc.,

WOOLWICH-ELLIOTT CHEMICAL CO., LTD.
L. M. Breillat, Secretary.

83, Pitt Street,
Sydney,
December 1, 1932.

POST-GRADUATE STUDY IN EUROPE.

SIR: I have just returned from a visit to the chief Continental clinics, and a little information about them may be of interest to graduates who are contemplating an overseas visit.

In Berlin the Association of Lecturers for Post-Graduate Work is a very fine organization. With it are associated 200 professors and directors of hospitals who control over 20,000 beds. In the last year an English-speaking section of this Association has been splendidly organized by this section secretary, Miss Engel. Miss Engel had previously been secretary to the American Medical Society at Vienna for over twenty years, and thus had abundant experience to help her in her new sphere.

The membership fee for visiting any of the clinics is only nominal. Any courses one wishes to take, either on the cadaver or the living, are easily arranged and very reasonably charged for. Most of the professors speak English, and those that do not usually have an assistant who does, so that one is not handicapped by a lack of German.

Vienna also has very fine clinics, and English is very largely spoken in all, due to the large number of Americans constantly present. Vienna, however, is feeling the universal depression apparently more than other countries, and this was reflected in the atmosphere of the clinics.

Paris has excellent clinics, but the facilities offering for post-graduate study by foreigners are not organized like they are in the other two cities.

Yours, etc.,

RICHARD FRANCIS, M.B., Ch.M., F.R.A.C.S.

135, Macquarie Street,
Sydney,
October 10, 1932.

PROSTATECTOMY.

SIR: I regret very much the unjust and illogical tone of the article headed "Prostatectomy" in THE MEDICAL JOURNAL OF AUSTRALIA of November 26.

Apparently the writer assumes because a distinguished surgeon lectures on the sequelæ of an operation, that all those complications may be expected by a patient who submits to surgery. To my mind the sentence beginning "The post-operative complications which, Walker tells us, may be expected by the patient are" allows of no other construction. Would he and our other teachers preserve a better status if they simply said: "I have described the operative technique, but can conceive of no complications"? Possibly, if urologists alone did genito-urinary surgery, a fresh text book might be written and sequelæ and untoward events omitted as relics of the past which boasted no urinary specialists. Undoubtedly that is the millennium for which all urologists should strive in the interests of humanity.

I must confess that I would not regard freeing the bladder from the scar and *os pubis* as a necessarily major operation and am inclined to leave the pre-operative arrangements to the surgeon in question. Most patients require an assurance that one will "cure their trouble" rather than a dissertation on the anatomy, pathology and surgery of a complication. I would not regard that as a dishonest procedure, as imputed, and would think that most Sydney surgeons would agree with me in opinion and practice.

I do not think a full set of statistics of the mortality of prostatectomy for the whole of Sydney has ever been published. Surgeons have published their own figures, I know, and they are very reassuring. It is not so reassuring to inspect the post-operative condition of inmates of the State Hospital at Lidcombe. By all means let us collect statistics and publish them when we think fit, and even compare them with those of other centres, but let us have the figures before we state the case as we would like it to be. I am heartily in accord with one statement in the article: "We venture to suggest that with further experience of the operation as carried out by Harris himself . . . he would alter his opinion." I would venture to suggest to the writer that were he to see the operation as carried out by Thomson-Walker himself he would see little in the way of "abominations in treatment".

He would probably be very surprised to learn that in the hands of that surgeon the mortality is well under 5%, which to me seems some justification for "persevering with the operation".

Even the most ardent adherents of a technique that aims at hæmostasis in a septic cavity by tension sutures and the reconstruction of a cavity distorted by Nature over a period of years, must agree that judicious packing in conjunction with some sutures not under great tension, with free drainage of the cavity, is not unsurgical on general principles.

Without in any way decrying the Harris operation, I am convinced that for the average surgeon the open operation of Thomson-Walker will be followed by less sequelæ.

Yours, etc.,

KEITH KIRKLAND.

137, Macquarie Street,
Sydney,
November 28, 1932.

NOTICE.

THE reconstituted Officers' Mess of the Australian Army Medical Corps (Second Military District) will hold a mess dinner at the Australian Army Medical Corps Drill Hall, Victoria Barracks, on Saturday, December 17, at 7 p.m. All members of the Australian Army Medical Corps on the Active, Reserve, Unattached or Retired Lists, ex-members of the Royal Army Medical Corps, members of the Royal Australian Air Force (Medical Services), members and ex-members of the Dental Corps, together with their professional friends, are invited to attend and to insure the success of the function. The tickets will be six shillings per member. Dress will be plain clothes without decorations. Officers who intend to be present are requested to notify Colonel P. Fiaschi or Colonel V. Conrick, the Joint Honorary Secretaries, 178, Phillip Street, Sydney.

Books Received.

A SHORTER ORTHOPÆDIC SURGERY, by R. Brooke, M.S., F.R.C.S.; 1932. Bristol: John Wright and Sons, Limited. Royal 8vo., pp. 150, with 126 illustrations. Price: 10s. 6d. net.

THE LEGAL AND ETHICAL ASPECTS OF MEDICAL QUACKERY, by L. Le M. Minty, Ph.D., B.Sc., B.Com., LL.B.; 1932. London: William Heinemann (Medical Books) Limited. Crown 8vo., pp. 280. Price: 7s. 6d. net.

GENERAL PRACTICE SERIES: COMMON SKIN DISEASES, by A. C. Roxburgh, M.A., M.D., B.Ch., F.R.C.P.; 1932. London: H. K. Lewis and Company, Limited. Demy 8vo., pp. 342, with eight plates in colour and 110 illustrations in the text. Price: 18s. net.

THE ELEMENTS OF MEDICAL TREATMENT, by R. Hutchison, M.D., F.R.C.P.; Second Edition; 1932. Bristol: John Wright and Sons, Limited. Crown 8vo., pp. 188. Price: 5s. net.

MATERIA MEDICA: PHARMACY, PHARMACOLOGY AND THERAPEUTICS, by W. Hale-White, K.B.E., M.D., LL.D.; Twenty-First Edition; Revised by A. H. Douthwaite, M.D., F.R.C.P.; 1932. London: J. and A. Churchill. Crown 8vo., pp. 557. Price: 10s. 6d. net.

AN ELEMENTARY INTRODUCTION TO PHYSICS, DESCRIPTIVE, EXPERIMENTAL AND HISTORICAL, by E. Booth, M.C., B.Sc., F.Inst.P.; 1932. Sydney: Australasian Medical Publishing Company, Limited; London: H. K. Lewis and Company, Limited. Crown 8vo., pp. 465, with illustrations. Price: 5s. 6d. net.

EXPERIMENTAL ANALYSIS OF DEVELOPMENT, by B. Dürken, translated by H. G. and A. M. Newth; 1932. London: George Allen and Unwin, Limited. Demy 8vo., pp. 288, with illustrations. Price: 14s. net.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", page xvi.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer (male).

LEWISHAM HOSPITAL, SYDNEY, NEW SOUTH WALES: Resident Medical Officers.

ROCKHAMPTON HOSPITALS BOARD, QUEENSLAND: Resident Medical Officer.

THE PUBLIC SERVICE BOARD, SYDNEY, NEW SOUTH WALES: Assistant Medical Officer of Health (male).

THE UNIVERSITY OF MELBOURNE, VICTORIA: Beaney Scholar in Pathology.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associated Friendly Societies' Medical Institute. Mount Isa Mines. Toowoomba Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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quarter and are renewable on December 31. The rates are £1 for Australia and £2 5s. abroad *per annum* payable in advance.

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